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THE WILSON ORNITHOLOGICAL CLUB

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Named after ALEXANDER WILSON, the first American ornithologist.

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THE PRESIDENT'S PAGE

Who should be members of the Wilson Ornithological Club? This is a question for frequent discussion at meetings of the Club's Council, and at informal gatherings of members. Perhaps we all need to consider carefully just what individuals and groups the Club is designed to serve.

Of course we welcome the professionals in the field of ornithology and its related disciplines. Staff members of museums, universities, and colleges who are working in ornithology certainly have a place in the organization. This is also true of persons in federal and state agencies which deal with wildlife management. Throughout the years *The Wilson Bulletin* has published its share of important technical papers. Its reviews have done much to mold professional opinion on outdoor writing. Its graphic material has been excellent, and, in many instances, unique. Its columns have been open to articles and notes dealing with bird protection in particular, and conservation in general.

But the vast majority of bird students are not professionals. Fortunately, the amateur in the field can, and often does, make contributions which are as accurate and scientifically significant as the work of the best professionals. It may well be that the Wilson Club makes its greatest contribution through bringing the amateur and the professional together, and in upholding standards of scientific accuracy and effective presentation toward which they both may work.

The larger portion of our membership is, and will probably continue to be, in the amateur field. Our dues have been kept lower than in most comparable organizations. This enables the student or younger worker who is at the beginning of his career to affiliate with a scientific bird group, and to grow with it.

In the Wilson Ornithological Club there are various classes of membership. The privileges of membership, however, do not differ in the slightest. The associate member has exactly the same privileges as does the life member. Persons who join the Club as members other than associate simply contribute more toward making *The Wilson Bulletin* attractive and stimulating.

Like other scientific societies, the Wilson Club is having its difficulties in this time of increasing printing costs and lowered returns on investments. Our journal is costing so much more that we have simply been forced to reduce its size. This is not pleasing to any of us, and for the situation there is only one remedy. We need new members who will maintain a loyalty to the Club throughout the years, and we need more members who will feel that they can join as other than associates. Many present associates could, perhaps, increase their contributions through membership in one of the other classes.

The Club is conducting an active membership campaign through its Membership Committee, of which Seth Low, Patuxent Research Refuge, Laurel, Md., is Chairman, and Ralph Edeburn, Marshall College, Huntington, W. Va., is Vice-Chairman. In the last analysis, however, we must depend not on this committee but on the loyalty and services of individual Club members. You can be of great assistance if you will send to any member of the Committee the names of persons who should be in our ranks. Elsewhere in this issue is published the personnel of the Membership Committee. May we count on your help?

MAURICE BROOKS

CRIMSON-COLLARED GROSBEAK
(Rhodothraupis celaeno)

Adult male sketched on February 25, 1938, along the Río Santa Engracia, near Victoria, Tamaulipas, México, by George Miksch Sutton. The bird has just eaten a leaf of the shrubby nightshade, *Solanum verbascifolium*, in which it is perched.

THE CRIMSON-COLLARED GROSBEAK

BY GEORGE MIKSCH SUTTON

MANY a person who has journeyed about northeastern México following the principal highways has passed through the habitat of the Crimson-collared Grosbeak (*Rhodothraupis celaeno*) without even glimpsing the bird. Finding it sometimes requires careful search in the thicket. I have never seen it near Monterrey, but it is fairly common along the Río Camacho, a few miles southwest of Linares, Nuevo León; and in the Victoria region of Tamaulipas it is almost abundant. Along the Matamoros-Victoria highway I have encountered it as far north as Jimenez. It is endemic to eastern México, having been reported only from the states of Tamaulipas, Nuevo León, San Luis Potosí, Veracruz and Puebla. It inhabits the low country chiefly, though my friend L. Irby Davis informs me that he has seen it regularly, though in small numbers, in summer among the sweet gums at an elevation of 3400 feet on the highway between Antiguo Morelos and San Luis Potosí. Along the Río Sabinas, in southern Tamaulipas, it ranges only a short way above river-level. So far as I have been able to ascertain, it is non-migratory.

It is a little heavier than the Cardinal (*Richmondena cardinalis*) and has no crest. The adult male is hardly a gorgeous bird—but the dull red of his 'collar' and under parts is of a peculiarly Mexican shade which calls to mind ripening cactus fruit, hibiscus flowers half hidden by dark foliage and shadow, or a bright serape seen in the gathering dusk. The immature male and adult female are dull black on the head and chest, and olive green otherwise, with a yellowish wash on the hind neck, lower breast, belly, and wing linings.

I first saw *Rhodothraupis* in 1938 along the Río Santa Engracia (the highway marker then called it the Corona) a few kilometers north of Victoria. In dense clumps of shrubbery which sometimes completely covered certain flat, gravelly islands, I continued to see the plump, almost dumpy looking birds—not knowing, of course, what they were, but guessing that they were fringillids because of the obvious heaviness of their bills. They all seemed to be olive-green (there happened to be no adult males in the flocks), and I was much impressed by the way in which they tore off and munched mouthfuls of leaf. They sat in the shrubbery by the hour, it seemed, chewing away, sometimes letting pieces of the leaf drop and pensively reaching out for more. So far as I could see they were subsisting wholly on the thick, soft leaves of one species of plant—a shrubby nightshade, *Solanum verbascifolium*. In my notes I referred to the birds as 'leaf eaters'. They were, I found, not fat but very tender skinned. Their stomachs held a mass of chewed up leaves, a little gravel and traces of insects, but no seeds. Some of the specimens were partly spoiled by the time I

got them to the skinning table. The slipping of the throat and breast plumage was caused to some extent by the plant juice from the crop.

For some time I thought that all of these 'leaf eaters' were olive-green. I heard no song from them and their only call note seemed to be a thin, high, penetrating squeal. I heard from them no incisive *chip* like that of the Cardinal. One day I saw a black and red bird among them. When I watched this wonderful creature sitting among the nightshade, biting off chunks of leaf with its big bill, I realized that it was a 'leaf eater' too. My excitement, as I followed it about, can be imagined. Immediately after collecting it I painted its portrait (see frontispiece).

The song of *Rhodothraupis* is rich and full throated, resembling somewhat that of the Rose-breasted Grosbeak (*Pheucticus ludovicianus*), but having fewer curved or warbled notes. It is sung from the heart of a tree or thicket, rarely from the top. Seeing the singing bird requires careful slipping along the trails or waiting in the brush. The singer turns his head this way and that, usually standing straight and lifting his crown feathers. I have heard much singing from about the middle of March to early June.

The only Crimson-collared Grosbeak nest I ever saw was one found by Ernest P. Edwards on May 20, 1947. It was in a thicket not far from a trail near the Río Sabinas in southwestern Tamaulipas. It was of rather loose construction, not very deeply cupped, and thinly lined. It held three eggs. These were much like Cardinal eggs, but seemed to be larger and blunter. They were pale grayish blue in ground color, spotted all over with brown. The newly hatched young were orange-skinned with red mouth-lining and dark dorsal down (see Sutton, Lea, and Edwards, 1950. *Bird-Banding*, 21: 57). Edwards spent much time in a blind near this nest and saw the female come to it several times. He never saw the male at the nest, however.

University of Michigan Museum of Zoology, Ann Arbor

COWBIRD BEHAVIOR

BY AMELIA R. LASKEY

THE Cowbird (*Molothrus ater*) has been variously described in the literature as monogamous, polygamous, and promiscuous. As the species has been common in summer about my home in Nashville, Tennessee, I decided a few years ago to find out what I could about its territorial and mating behavior. I started color-banding in 1943, but did not undertake intensive watching until the following year. My observations were confined largely to the one and one-half acres about my home, especially to a small feeding place on the ground 25 feet from certain windows. In the breeding seasons of 1944, 1945 and 1946, I watched Cowbirds at various times of day from the arrival of the very first individual in March until the disappearance of the species in July. The birds came to the feeding place singly, in pairs, and in groups. Continuing my observations to some extent through the seasons of 1947 and 1948, I devoted several hundred hours, in all, to the study.

I attracted the Cowbirds with millet seed (the small, yellowish variety). In 1944 I confined feeding to a plot 21 by 5 feet near the house. At this gathering place, the scene of many intimidation, courtship and mating ceremonies, I gained a new understanding of the complex behavior of this highly social, parasitic species. That year my study centered in a population of 18 color-banded individuals (12 males and 6 females) and a few unmarked birds (three or more males and one or more females). In subsequent years, the population was not that large, but each year it included some birds returning from previous years. After 1944 I placed millet seed at other spots about the banding station so the activities of the birds were not concentrated at the main feeding plot.

My observations indicated monogamous mating, thus corroborating the conclusions of Herbert Friedmann, who studied unmarked Cowbirds at Ithaca, New York. He said (1929:171): ". . . if the birds are not really strictly monogamous, at least the tendency towards monogamy is very strong." However, my findings in the behavior pattern differed rather widely from his. I observed several types of behavior not heretofore described, particularly *intimidation bows* and *guarding of mates*. I found no evidence of such true territorial behavior as that discussed by Friedmann, but there was much evidence that one pair gained *dominance* in a certain area. This area, the *domain*, may be all that is left of "territory," and *guarding* all that is left of mate protection and isolation, in a social species whose breeding has become parasitical.

Songs and Call Notes

Two songs are frequently used by male Cowbirds. Friedmann (pp. 166–168) described Song 1 as the "true song . . . , the *bub ko lum tseee*, as Wetmore writes it." The *bub ko lum* part is a soft guttural gurgle, inaudible beyond 50 feet,

while the *tseee* is high, shrill, and sometimes considerably prolonged. Song 2, which Friedmann regarded as one of four call notes, he called the "flight whistle," describing it as a "thin, wheezy inhaling squeak, *whssss*, [followed by a] not so wheezy, exhaling whistle, *pseeee*."

Males at my banding station used Song 1 when posturing alone on a high perch, and when displaying before males in intimidation or before females in courtship. They used it less frequently in late summer than in spring and early summer. I have an early September record of a male singing and posturing alone in a tree.

Song 2 I heard more frequently than any other vocal sound of the species, although at times it was not complete. It was used as the male started to fly and as he alighted, but males sometimes flew without singing. Usually Song 2 seemed to serve as a means of keeping in touch with other Cowbirds. When feeding alone on the ground, a male often stopped, raised his head and sang, turned and sang again as if to send the note in a different direction, then stood still as if listening for an answer. Sometimes a male flew quickly toward the sound on hearing Song 2 in the distance. Song 2 was used by members of a feeding group. I knew of the arrival of a pair near the feeding station before seeing them because the male used Song 2 and the female "rattled" or chattered. This chatter note, a common utterance of the female, appeared to be her call to the male.

Notes that may have accompanied copulation I did not hear because of extraneous sounds. Friedmann (p. 167) described the male's mating note as "high, shrill, and in a descending scale." In 1944 and 1945 (four occasions) I heard the female use the rattle or chatter note just before copulation.

I heard short notes like *tic*, *phut*, or *kek* from the female as she fed alone, but never from the male feeding alone. The male used a note of this sort following a disturbance, however. Thus if the passing of a person caused him to fly up from the feeding place he would give a low-toned but emphatic *kek*. Sometimes he repeated this single note so rapidly that it sounded like the rattle of the female. On April 12, 1944, a pair used these notes and chatter as I walked past. I interpreted the notes as scolding or alarm notes. But on other occasions there was no response as I passed. On April 29, 1944, a male flew to a shrub and gave the short note as I removed a female from a banding trap. He waited some minutes until she was released from indoors, then followed her in flight, using Song 2. On another occasion, a different male used the short note as I removed a female from a trap.

Posturing and Display

The commonest intimidation gesture used by the male Cowbird is *bill-pointing*. Friedmann (p. 175) said of this display: "They have what might be thought of as an intimidation display which may be sufficient to drive off newcomers. This consists of pointing the bill towards the zenith when near another male."

After watching hundreds of displays, most of them on the ground, I decided that certain displays had not yet been described. Elaborate "toppling-forward" bows, with wings and tail spread and bill or head touching the ground, were made in intimidation or threat. The *peck-gesture* was another sort of threat. In this display, the plumage was usually puffed, the wings spread horizontally or raised vertically, and the head thrust forward. Sometimes there were a few running steps or a flight toward the other bird. At times the display ended in actual pecking or fighting. Both of these types of intimidation display were used toward other male Cowbirds and occasionally toward a Mourning Dove (*Zenaidura macroura*), Grackle (*Quiscalus quiscula*), Brown Thrasher (*Toxostoma rufum*), or House Sparrow (*Passer domesticus*).

I saw five fights between male Cowbirds in April, 1944. During that same period, I was witness also to a peck-fight between a male Cowbird and a Brown Thrasher. The Cowbird was the aggressor. In May, 1944, I saw a male Cowbird viciously attack a House Sparrow. In April, 1945, I saw a male Cowbird strike at a female Cowbird three times within a few minutes, once while flying and twice on the ground. The attack appeared to be hostile. Nice (1937:154) mentions five instances of fights in April between male Cowbirds at Columbus, Ohio. Friedmann (1929:175) knew "of no instance of two male Cowbirds fighting."

I saw female Cowbirds intimidating other Cowbirds of both sexes through *bill-pointing*, *peck-gestures*, and (very rarely) through bowing. On June 15, 1944 and April 9, 1945, I saw fights between females. Friedmann described no female display or fighting.

Another type of behavior, indulged in mostly by the dominant male of each season, was a repetition of trips to the water pan between displays. Sometimes after running to the pan, he merely dipped his bill. Sometimes he failed to drink. All this seemed to be substitute behavior in moments of excitement.

Courtship

Bows extended in greeting or courtship by males to females were less elaborate than intimidation bows. Greeting bows of this sort varied considerably; sometimes they were only a nod, accompanied by ruffling of the neck plumage, sometimes a deep bow, involving spreading of wings and tail, sometimes a mere relaxing of the wings. Occasionally a male bowed in greeting just after stretching tall, or pranced beside the female before bowing. On April 19, 1944, when 5M was displaying to 2F, he seemed to rise as he braced himself with tail against the ground just before bowing. When displaying alone in a tree, he often terminated his bow with a bill-wiping gesture.

The dominant female of the season displayed by relaxing her wings, puffing her plumage, vibrating her tail, and quivering her wings. These displays were, I believe, connected with courtship and mating.

In pair formation ceremonies, both birds indulged in stretching, usually of a sidewise sort. This I witnessed on April 10, 1944, March 24, 1945, and March 30, 1946, the two participants being dominant.

On two occasions I saw a male toying with a dead leaf or a piece of debris while bowing to a female (April 8 and May 29, 1944).

A common type of behavior was *guarding*. In this maneuver, the male ran quickly between a female and one or more males, and attempted to remain between them while the group was feeding or otherwise engaged. While guarding, a male sometimes bowed low to another male, then turned to extend a shallow bow to the female. The dominant female occasionally guarded her mate from another female. Guarding was practiced mostly by the dominant pair of a group, but I occasionally saw a visiting male guarding the female accompanying him.

Courtship and Contentions for Social Dominance

The first Cowbird of the 1944 season, 1M, arrived March 16. (He had been banded as an adult on June 7, 1940, and had returned in March, 1942 and April, 1943.) On March 23, 1944 another male arrived. I banded him and called him 3M. I saw these two males separately, several times, feeding peaceably with Mourning Doves, Cardinals (*Richmondena cardinalis*), Red-eyed Towhees (*Pipilo erythrophthalmus*), Slate-colored Juncos (*Junco hyemalis*), House Sparrows, and Field Sparrows (*Spizella pusilla*). The Cowbirds sometimes scratched in their desultory manner. Scratching was prefaced by a slight hop which ended with the feet spread apart, one beyond the other or in a sidewise spread, as if one foot had slid backward or to the side. I heard only the flight whistle those first few days, but on March 22, 1M, perching in a tree above the feeding place, postured and used Songs 1 and 2 for several minutes. I saw no other bird anywhere in the vicinity at the time.

On March 26, a female came with 1M. The following day, at the food, he ran to her with puffed plumage and bowed each time she stood still, but she always moved away. I caught and banded this female on March 28, naming her 1F. For several days 1M and 1F followed each other and fed together, the male continuing his displays. But early on April 1, I saw 1F feeding with an unbanded male that displayed to her. Suddenly 1M swooped down and attacked this male. After a brief fight, the unbanded male moved to another feeding spot a few feet away and 1M joined the female. Once she moved toward the unbanded male, but 1M ran between them, guarding her. That day I saw 1M and 1F feeding together several times.

On April 2, other Cowbirds arrived. Near noon, 1M, 3M, and two unbanded males were feeding amicably within six inches of each other when suddenly a Brown Thrasher appeared. 1M instantly assumed a fighting posture (peck-gesture) toward this bird and the thrasher returned the gesture. They hopped at each other several times as if striking bills. As the thrasher flew off, two Cow-

birds, apparently the banded ones, entangled in a fight, rolling on the ground. Then all four Cowbirds flew off.

On April 3, 1F came at 8:00 a.m. with an unbanded male which I trapped and named 4M. (This visitor did not appear again until June 14, on which date he stayed briefly.) On April 4, 1M and IF were together. Once I saw him walk completely around her. Though her wings were relaxed in courtship display, she evaded him.

Early on April 6, two strangers appeared, a transient female and a male Cowbird that remained in the area. These I banded, naming them, respectively, 3F and 5M.

On April 8 two color-banded females arrived, 2F (banded in April, 1943) and 5F (banded in September, 1942, retrapped in March, 1943). That day nine Cowbirds visited the feeding area singly and in groups—1M, 3M, 5M, three unbanded males (one with an injured foot), 1F, 2F, and 5F. There were many encounters for supremacy among the males. Some of these encounters may have resulted directly from courtship displays before the females.

At 10:25 a.m. an unbanded male, landing near 1F, threatened another unbanded male by bill-pointing, causing the latter to cower and run. At 10:30 an unbanded male landed near a banded female Mourning Dove and raised his wings as if to fight. The dove retaliated in kind, so he retreated and fed five feet away. At 10:40, 3M, accompanied by two male and two female Cowbirds, arrived and 3M displayed to 2F. At 10:50, while 5M and a dove were the only birds at the feeding plot, 1M arrived and ate amicably beside 5M until an unbanded male arrived. 1M now raised his wings and ran at the newcomer with the peck-gesture, but the newcomer merely moved a bit and 1M soon joined him. They fed briefly and the two flew off, 1M leaving first. At 11:15 I saw 3M attempting to chase 5M and an unbanded male by running at them with the peck-gesture. This did not put them to flight. 3M repeated the hostile gesture to the unbanded male, but all remained to feed. Then 1M arrived. The three other males now flew, and 1M, alone, strutted a bit with up-pointed bill. As 2F and an unbanded singing male arrived, he amicably joined them, the female feeding close to him for a brief period. At 11:30 1M and 1F arrived together. Presently 5M landed nearby. 1M ignored 5M, but twice displayed to 1F, with puffed plumage, extended wings, and Song 1.

At noon a peculiar ceremony took place betwen 1M and two unbanded males. Although feeding some distance apart, each displayed by puffing his plumage and dragging his tail. After five minutes of this behavior, they formed a triangle a few inches apart, all facing inward. They repeatedly bowed, bending forward until their bills touched the ground, meanwhile spreading their wings and tail. After a minute-long performance, one walked away, while the other continued to display to 1M. 1M moved off but rejoined the displaying one. Both then bill-pointed several times as they walked. The unbanded one bowed low to 1M, who suddenly flew at him, chasing him some feet, then the three birds flew.

During the next three hours, once an unbanded male fed amicably with 3M, and once 3M and 2F fed together while an unbanded male ran around them, 3M bowing to him until the unbanded male went to the far end to eat alone. Later 1M fed amicably with an unbanded male, but when another unbanded male arrived, he ran at the second with a peck-gesture; then all fed amicably together. 1F and 2F appeared at the food several times, each accompanied by one or two unbanded males.

At 3:22 p.m. 1F arrived, alighting in a tree near the feeding place. On previous occasions she had rattled once on arrival, but now she reiterated her call. As if in response, an unbanded male alighted in a nearby tree. Facing her, he gave two bowing displays. When she flew off, he followed her. Presently she returned to feed. An unbanded male was still following her. On being joined by 3M, the unbanded male started a display to 1F. He made a quarter turn toward her, bowing slightly, continuing to follow her as she fed, circling about her as he puffed plumage and bowed. In the course of these displays, he pecked at and picked up a piece of debris. A few seconds of feeding followed the courtship display, whereupon the males faced each other in bowing ceremonies. Each time a male moved, 1F ran a bit, avoiding any close contact with either.

At 3:40, 1F and 1M arrived, joining the sole occupant of the feeding plot, an unbanded male. A low-flying male appeared but did not alight when 1M assumed a fighting posture. When 3M arrived somewhat later, he came near 1F, and 1M guarded her as they moved about feeding.

There was more bowing and gathering in groups for the rest of the day, with 3M attending 2F, intimidating 5M with very low bows, and simultaneously guarding the female. Once when 5M and an unbanded male met, the latter retreated at 5M's bowing. Shortly after 5:00 o'clock, when four males and a female were present, another ceremony occurred. After 5M had displayed to an unbanded male, 1M bill-pointed as he walked toward them. The unbanded male bowed low to 1M in response, backing as he did so. 3M, who had been feeding several feet away with 2F, joined the other males and the four birds formed a square, facing inward. They bowed repeatedly, touching the ground in elaborate intimidation display. 3M withdrew to join the female but soon rejoined the posturing males. Presently 5M walked off a short distance, leaving the others to bow for another minute. The five birds flew off in a group.

Early the following morning, April 9, I caught the two unbanded males, naming them 6M and 2M. 6M stayed only until that evening and was not seen again. 2M became the dominant male of the season, spending more time at our place than any other Cowbird. Between April 8 and July 1, I saw him 249 times. He apparently considered himself the proprietor of the feeding plot and environs. He became the mate of 1F, displacing 1M, who had courted her and threatened the other males. On April 9 I saw neither 2M nor 1F, but 1M and 6M came to feed, sometimes amicably.

On April 10, I did not see 1M. He made his final appearance April 11 when he came for a few minutes to feed with an unidentified male.

Pair Formation, Mating, and Social Dominance of the Pair

From April 10 on, 2M guarded 1F and intimidated other males. At 4:50 p.m. on April 10, I noted the following: "3M at food, 2M and 1F arrived together, 1F rattled twice, 2M pointed bill, ran to 3M, bowed to ground twice with Song 1, female rattled, 2M again bowed very low to 3M without song, ending by touching bill twice to ground. He returned to female. At 5:06, began another series of 4 low bows to 3M, followed by a shallow bow and plumage puff to female. 5:08, standing midway between 3M and the female, 2M bowed 4 times to 3M who flew; 5:10, 2M, now feeding near the female, ran, pecking the ground. For 8 minutes they stayed together. She had wings relaxed, slightly extended from sides. When the male fed close to her, she quivered the wings briefly. Both occasionally fluffed neck plumage. Male stretched once, female stretched twice during this period. This was a sidewise stretch—wings were raised slightly, then one leg was extended backward as the corresponding wing was spread groundward. Then he approached her with a quarter turn, head lowered in the manner of a domestic cock. They flew, but she returned. She stretched again with upraised wings, then bent legs at metatarsal joints. A Brown Thrasher arrived just then; 1F assumed the peck-gesture to the other bird."

At 7:45 that evening, the pair (2M and 1F) were feeding when an unbanded male arrived. Facing the male, 2M made six or seven elaborate bows, interspersed with two shallow bows as he faced the female, guarding her. During the next several days, I saw the pair together many times. Displays which I noted included "a dancing toward her, preceding the shallow bow" and "the quarter turn side bow (facing diagonally)."

Copulation

When 2M came to the feeding place on the morning of April 16, he was alone. Alighting in a tree he used Song 1, flew to the ground to feed, sang several songs, indulged in some mild posturing, ran to the water pan, then ran back to the food. Six minutes later, he gave a shallow bow, ran again to the water pan, and flew off. At 10:18 he was back. He sang several songs on the ground, usually No. 2. At 10:23, 1F arrived with her rattle call, and alighted in a tree above him. He flew to her, alighted on a branch beside her, and bowed. She squatted, elevating her tail. He mounted briefly then hopped to a limb. She remained quietly for a few seconds before flying to the ground to feed. He followed, displaying there a few times.

Twice later that season I witnessed copulation between the pair. On April 20 at 9:00 a.m. both were in a tree above the feeding plot. He sang and she rattled just preceding the mating act, which was accompanied by considerable fluttering. The male followed her down to feed but soon flew off. Then an amus-

ing three-minute episode occurred. He returned immediately with another female, 5F, who had been here the previous two seasons. He and 5F stopped within a few feet of his mate. The latter approached 5F with up-pointed bill and bowed fairly low to her. The male came between them. 1F walked back to her feeding spot. The male joined her but only momentarily, for he was soon back with 5F. Again 1F walked to 5F, circling slowly around her, bill-pointing. 5F started to leave, but once more 2M walked between the females. This time 5F flew, 2M after her, 1F trailing. About three-quarters of an hour later, 1F came back, followed closely by 2M, who approached her with puffed plumage. She ran at him, striking him with her bill. He moved away, but she walked after him and followed him when he flew. In about fifteen minutes, 1F was again at the food when 2F arrived. 1F bill-pointed and the other female flew.

April 28, at 9:05 a.m., 1F, who was alone at the feeding place, rattled and quivered her wings. During the four minutes following this, she turned clockwise gradually, raising her head to send the rattle in all directions, until 2M joined her. As they fed together he bowed. They flew off when a Mourning Dove arrived.

The third time I saw copulation in 1944 was shortly before 7:30 a.m. on May 12. 1F arrived in a tree and rattled repeatedly as she puffed her plumage. Her mate (2M) arrived. The two flew down to the driveway. As he walked to her, she rattled, quivering her wings. He mounted, then moved in a semicircle about her, bowing lightly and making a motion as if to mount again. She repulsed him with the peck-gesture, although quivering her wings slightly. They flew to the feeding plot where she again quivered her wings. An arriving male, greeted by 2M with a low elaborate intimidation bow, moved some distance to one side, behaved as if wary, fed briefly, and flew off.

Six times between April 23 and May 12, 1944 I saw 1F quivering her wings when 2M was with her, and the only time I saw her quiver her wings otherwise was an occasion when 2M probably was close at hand. I did not see any other male than 2M direct courtship bows toward 1F after April 8, until May 25 when an unbanded male arrived. This newcomer courted her and other females occasionally until June 23. I saw him direct six bows to her (once also guarding her from 8M, banded April 29, 1944) but in each instance she used the peck-gesture in return.

Status of Other Resident Cowbirds

During 92 observations of 2F and 16 of 5F, I never saw either respond to the courtship displays of bowing males. However, by noting the guarding behavior and intimidation displays of their male companions, I gathered some circumstantial evidence as to which males were their mates. Previous to May 4, 2F was courted by 3M and 5M. The latter attacked the domain-holder 2M on April 16 when that usually dominant male joined them. On April 25, 5M

A male Cowbird intimidating another male through bill-pointing. Photographed at Ithaca, New York, by Arthur A. Allen.

bill-pointed 2M and guarded 2F from him. But after the early part of May, 8M was almost certainly her mate. He consistently accompanied her and used intimidation display in her behalf. Of three recorded instances of intimidation, two were directed toward the dominant 2M. It is possible that 8M had associated and mated with 2F elsewhere previous to his first-observed visit to the feeding plot (April 29), or that she took him as her mate at about that time.

Much less is known about 5F. Late in the season, she was the most constant

companion of a male aluminum-banded in some previous year but not retrapped for identification. The dominant 2M extended more favorable attention to her than he did to 2F. He sometimes intimidated 2F who spent much time in or near the feeding plot.

I do not know whether 3M and 5M secured mates. I think it highly improbable that 3M won any of the females I saw him courting. He spent more days in the area than any other male Cowbird except domain-holder 2M (I saw 3M on 93 occasions), yet he was under almost continuous domination and was nearly always the "extra" male among the groups.

Referring to Cowbird mating, Nice (1937:153) states: ". . . here on Interpont, with an abundance of Cowbirds, promiscuity prevails just as the older writers maintained." Although my Nashville group mingled freely in social contacts, I found no evidence of promiscuity among the females. My observations in 1945 and 1946 strengthen my belief that Cowbirds are essentially monogamous. I saw copulation only once in each of those seasons and in both instances the participants were the dominant pair of that season.

The Question of Territory: the Domain

Cowbirds have shown strong attachment to certain areas, particularly breeding areas. The remarkable homing experiments of Lyon (1935:7) and Fox (1940) prove that a deported bird will return 'home' from a distant point within a short time. Banding records show numerous returns for several years to the breeding area. Records of return for two and three seasons have been published by Laskey (1944) for four females and one male (with several additions since then). Stevens (1944), who lists returns of ten individuals, informs me by letter that five of these were males and five females, and that three of the females returned for three consecutive years. O. M. Bryens has sent me data from his banding station in Michigan showing that of 2982 Cowbirds banded, 150 were retaken, some of them for several years. Nice (1939:81) found that three females spent two years, and that two females spent three years on Interpont (Ohio). Her color-banded Cowbirds ranged within 18–20 acres usually, within 30 acres occasionally. After their disappearance in July, three of her females revisited their breeding area in September and October (1937:154).

Being unable to follow my color-banded birds in the numerous trees and thickets of our neighborhood, I did not learn how far they ranged. I do have information, however, on their territorial behavior about our house. According to Mayr, Tinbergen, Noble, and Nice (Nice, 1943:162), territory is a *defended* area. Although I saw many threats and fights, they did not seem to be in defense of territory and I witnessed no sustained effort to keep males or females out of a pre-empted area. There was much evidence of what I came to regard as sexual jealousy, however, and, particularly early in the season, of strife for dominance. There was no indication of a peck-order similar to that described

by Allee for domestic chickens (Nice, 1943:92) nor of a society comparable to that of the Jackdaw (*Corvus monedula*), a society in which, according to Lorenz (1938:210) "every bird is jealous of his own position, constantly bickering with those that are his direct subordinates, but distinctly tolerant of those that range far below himself."

The ground about our home could be called a Cowbird *domain*, for it was occupied each season by a dominant male and a dominant female, his mate. They alone used this area for pair formation and mating. They did not drive other Cowbirds from food in this domain, and they tolerated Cowbirds of both sexes in social contacts, feeding and flying together with them. I believe the dominant pair showed vestigial territory behavior in intimidating others and keeping the domain for their own in pair formation and mating. This might be classed as 'Type C, mating station only' (Nice, 1943:163), modified by the fact that they did not object to others feeding there.

Friedmann (1929:175) believed that Cowbirds have definite territories. He said: "Not only has the female a definitely marked-off breeding area, but the male has a definite post, entirely comparable to the 'singing tree' that Mousley describes." He described territories of three pairs at Ithaca but stated (p. 177): "All Cowbird territories studied were not quite as definite as these three. On the west shore of Cayuga Lake the Cowbirds were found to merge the extremities of their areas into neighboring ones. . . ." He also stated (p. 177): "The Cowbirds do not make any very spirited attempts to defend their territories and consequently in regions of unusual abundance the territorial factor is much less noticeable. I have never seen Cowbirds fight and their method of defense is restricted to an intimidation display." (This was the bill-pointing gesture.) Nice (1937:154) said: "Although Cowbirds show no impulse to defend a territory, yet they appear much attached to their spring and early summer homes."

Acquiring the Domain

At Nashville during the first part of the season in 1944, 1M held the domain about the feeding plot. He was the first Cowbird to arrive that year and he had lived here three years previously. Early in 1944 he was tolerant of other feeders, showing no aversion to any bird. The first of the females to join him, 1F, he courted as they flew and fed together. He first employed intimidation when an arriving male began to display to 1F. Becoming pugnacious, he fought male Cowbirds, showed belligerence to other species, and participated in elaborate intimidation displays, guarding 1F from other males. So far as I could tell, however, she did not choose her mate until nearly two weeks after her arrival. In the meantime, she fed and flew about with various males. In the contests between 1M and other males from April 1 to 8, I was not always able to analyze the motives in their behavior. There seemed to be strife and ceremonies for dominance as well as for the favor of a certain female. There were at least two

other females, but the domain-holder (2M) showed only passing interest in one of them and none at all in the other. Whether the winner acquired dominance first or the mate first is a question.

On April 8 there were triangle and quadrangle ceremonies among the males, and 1F definitely accepted 2M. I saw no further association of 1M and 1F. Although 1M came to the feeding place several times April 9–11, I did not see a female with him, nor did I see him at all after April 11. From April 10 on, 2M dominated the area. His mate, 1F, also participated in intimidation behavior, dominating the females. I recorded 85 intimidation displays by 2M to individual male Cowbirds, 7 to groups of Cowbirds, 9 to a female Cowbird (2F), and 10 to an individual Mourning Dove, Blue Jay (*Cyanocitta cristata*), Grackle, Brown Thrasher, or House Sparrow. Some 30 displays he directed solely toward 3M, who spent more time about the feeding plot than any other male except himself, and each time he displayed before a group, 3M was part of that group. Only occasionally did 3M bow low or bill-point before 2M, and when he did he was apparently attempting to gain the interest of a female. Sometimes he revealed his timidity by feeding hurriedly and warily when 2M threatened him. Usually he stolidly continued his feeding, keeping his distance when 1F was present. The other males that came regularly showed similar acceptance of 2M as a despot (a mild one) over the domain as long as he did not bow to the females with them.

Sexual Jealousy

The following incidents show, I believe, that intimidation gestures and fighting were not in defense of a piece of ground as in territorial behavior, but were purely sexual.

On April 16, when 5M and 2F were the only birds at the feeding place, and were feeding together, 2M arrived. 5M attacked him, but 2M ran to the female, and 5M came between them to guard her. She walked a few feet and the males fed together—amicably so far as I could see. When 2M moved away, 5M followed him. When 2F flew, both males followed her. Similar encounters occurred between 8M and 2M in the presence of 2F when 8M accompanied her, but these did not involve actual attack.

Strange males, when arriving, used intimidation bows to the dominant 2M at first meetings but he bowed deeply in return and they made no further attempt to intimidate him. Strange males displayed to 1F in his absence. On May 25, June 2, and June 25, unbanded males extended the courtship bow and one guarded, but 1F responded by peck-gestures. *I never saw a resident male aside from her own mate escorting her, or displaying to her, after she had mated.* On the other hand, 2M was not averse to extending the courtship bow to 5F or accompanying that female in flight.

The only female that displayed in any way on the domain in 1944 was 1F. She used the bill-pointing gesture nine times in intimidating other Cowbirds (eight times to a female, once to an unbanded male). She bowed once to a

female, 5F, when her mate (2M) was showing attention to this bird. She used the peck-gesture 18 times—once to a Towhee, five times to another female Cowbird, eight times to a newly-arrived male Cowbird that bowed to her, and four times to her mate, repulsing his advances. On the day she fought with an unbanded female (June 15), she first attempted intimidation by bill-pointing. With tail elevated, she fed 6 to 12 inches away, but often stopped to bill-point. Then she ran at the intruder. At this point her mate arrived, and she guarded him from the other female by keeping between them, bill-pointing. When the intruding female approached 2M, 1F ran at her, attacking so vigorously that they rolled on the ground and one of them cried out in pain.

I observed one instance of teamwork between the dominant pair in intimidation. My notes (May 6) read: "2M, 8M feeding, 2M bill-pointing, bowing low. Then 2F arrived; she walked toward 2M as she fed, 8M joined them, guarding the female. In a few seconds 8M bowed low to 2M and ran to another feeding spot where 2F soon joined him. Then 2M bill-pointed, drank once, fed, then flew without song, returning immediately with his mate 1F; 2M and 1F pointed bills upward as they walked around the other pair, which flew."

On another occasion, June 19, as the dominant pair fed, 8M arrived, and 2M made numerous low bows as he followed the other male. 8M responded with two low bows. Then 8M's mate, 2F, arrived and 1F bill-pointed on meeting her. 2F circled on foot to join her mate. 1F followed, still bill-pointing. Then all fed walking abreast, the two males in the center, each male thus guarding his mate from the other male. A few more displays by the dominant pair put the 8M-2F pair to flight. The dominant pair followed. Presently all four birds returned, fed together for a while, and flew off again in the same order.

Drouth in 1944 caused a serious food and water shortage for wild life by the last of June, the end of the Cowbirds' breeding season. Despite the abundance of millet seed and water near my home, the Cowbirds followed their usual custom and departed. The adults began to disappear in early July and all had gone by the 15th. None reappeared at the banding station that year. I seldom see adult Cowbirds near Nashville between mid-July and flocking time in September.

The Domain Holder and Dominant Female as Mates

What I observed in 1945 seemed to indicate that the dominant male mated with the dominant female of the same area. How this came about I could not be sure. To me it appeared that the female which was successful in gaining dominance among females in an area of her own choosing accepted the dominant male of that same area as her mate. In 1945, as in 1944, the dominant male was 2M. Early that spring two females had frequented the banding station—5F, a resident of previous years, and a new arrival, 7F, banded and named on March 27. I saw 2M with both of these females from time to time but did not for some weeks observe anything indicating that he had mated with either.

On April 9 at 7:45 a.m., 2M arrived at the feeding plot with an unbanded female. This female I caught and banded, naming her 8F. As she fed, 8M directed courtship bows and Song 1 to her several times, but received no response. When 7F arrived, 8F attacked her; but when 2M flew off the two females remained to feed. About two minutes later, 2M returned. In what appeared to me to be a pugnacious manner, he attacked 7F, twice on the ground, once in the air, driving her off a short distance. Twice, during these encounters, she used the rattle. She returned immediately after each attack. When 2M left the feeding place again, 7F began bill-pointing 8F, following her over the feeding plot and into the adjoining flower bed. When 2M returned, 7F was some distance from 8F. Having directed a courtship bow to 8F, he left. Presently the two females flew off together. Later that day I saw 2M and 8F together at least twice; he bowed to her but she ignored him.

On April 10, I saw 2M and 8F again at the feeding plot. He apparently was courting her. After his departure from the plot when 7F arrived, 8F started to bill-point her. The two females used this gesture in trees and on the ground for a considerable period, apparently trying to intimidate each other; but 8F gradually became less aggressive and more wary, and later in the day I noted that *it was 7F who followed 2M in flights from the feeding plot*—a characteristic of the female of the dominant pair. I did not see 8F after that day. 7F became the dominant female, the mate of 2M. This position she held until her death on May 20. 2M had no mate after that in 1945.

In 1946, 2M was the first Cowbird to arrive. He came on March 11 and was dominant over other males until March 29. On that date 4M, a visitor of 1944 and 1945, appeared, accompanied by the first female of the season, an unbanded individual. She showed pugnacity that first day by using the peck-gesture to a male Cardinal and later, as other female Cowbirds arrived, she displayed to them with bill-points and peck-gestures. I banded her on April 1 calling her 9F. She was the mate of 4M. From that date, 2M began to lose position as head of the domain. 4M assumed the dominant place, using intimidation gestures toward 2M and other males with no retaliation from them. Although 2M remained as a resident for the season, I saw him less and less frequently and never with a mate. This seems to be further proof that holding the dominant position among males is closely linked with acquiring the dominant female as a mate.

To summarize: in 1944, the dominant position of the first arrival, 1M (a resident of previous years) was forfeited when the dominant female rejected him in favor of 2M, a male which gained dominance among males. In 1945, 2M retained the domain and acquired the dominant female, 7F, as his mate, although he apparently had preferred 8F. In 1946, 2M arrived first but lost the domain to 4M, who had been there as a visitor in the two previous years, and who had as his mate 9F, the dominant female of 1946.

Egg-laying

The first Cowbird egg that I found in 1944 was laid in a Cardinal nest on April 23. On the morning of the previous day I had noticed an excited group of Cowbirds (including 2M, 5M, and 1F) above this nest, and had seen 2M attack 5M there. The third Cardinal egg of the set had been laid April 22. On the 23rd this third Cardinal egg was missing and the Cowbird egg was in its place.

On April 26, at 9:00 a.m., I saw a female Cowbird emerge from a dense shrub border at the rear of our place, a hundred feet from the Cardinal's nest. Investigating, I found a Towhee's nest two and a half feet above the ground. In it were three eggs (one pierced), and on the ground below was another (cracked). All these eggs appeared to be Cowbird eggs. I did not see the owner of the nest. I removed the damaged eggs. At 10:30 I found the two eggs in the nest damaged —one pierced, the other broken. The following day I saw a female Cowbird there again. That day the Cardinal nest was empty, and I found a Cardinal egg (somewhat incubated) in the shrub border near the ravaged Towhee nest.

I captured 1F repeatedly in 1944, recording her weight 15 times from March 28 to June 25 (see Table 1). In general, she weighed somewhat less than 40

TABLE 1

Weights of Dominant Female 1F

1944	Morning	Grams	Afternoon	Grams
March 28			1:45	37.2
April 3	8:00	35.5		
12	7:00	36.7		
23			3:00	42.4
29			1:00	40.4
30	7:15	38.9	7:15	41.8
May 6	10:30	38.7		
9			2:00	38.8
18	11:45	40.1	6:30	41.9
25	7:00	37.9		
June 10	10:30	40.6		
22			2:00	38.9
25	7:00	36.7		

grams. But on April 23, April 29, April 30, May 18, and June 10 she weighed *over* 40 grams. These dates may well represent also her egg production periods. In any event, the findings tend to corroborate Nice's theory (1937:155 and 1942:89) that Cowbirds usually laid three sets of eggs per season in Ohio.

The weight of 6F on April 29, 1944 was 41.4 grams. Two recorded weights for her in previous years were 39.3 and 40 grams.

On the morning of May 6, 1944, 2F weighed 41 grams. She was probably in or near egg production at that time, for her average morning weight otherwise (4 records) was 39.5 grams. On May 9 and again on May 10, a Cowbird egg was laid in a White-eyed Vireo (*Vireo griseus*) nest in a shrubby border about a hundred feet east of the Towhee nest. This nest was also on 1F's domain, but I do not know which Cowbird laid the eggs. The eggs were not alike in markings and may have been laid by two females.

It is possible that, early in the season when host nests are scarce, two or more pairs of Cowbirds contend for "possession" of these nests. Most certainly there were contentions of some sort in the vicinity of the above-referred-to Cardinal and Towhee nests in 1944. When two or more female Cowbirds are ready to lay, it seems quite plausible that such rivalry should arise, that nests could be filled with Cowbird eggs, and that rival Cowbirds could destroy each other's eggs. My notes concerning the group of Cowbirds seen April 22 near the Cardinal's nest read as follows: "At least 3 males and 3 females were in great commotion in the rear section where all Cowbird eggs were found. 8:40–8:49 a.m. a pair flew to the dense growth of shrubbery and vines, some 30 feet south of the feeding place, under a large silver maple tree. This pair was followed by a male and another pair. Then a female perched for some time in another maple, some 20 feet from the first, over an exposed Mourning Dove nest (bird incubating). A few minutes later, 5M and a right-banded female perched in the first maple over an exposed Cardinal nest (set just completed). The male flew, leaving the female alone. Female 1F arrived in the tree, followed by 5F and a right-banded male: 1F landed near the end of a branch with some males crowding close, 5M nearest to her. He bowed. Then in a swift flight, a male, thought to be 2M, came and attacked the males nearest 1F. All flew to the east side of the lot, lost to sight in the dense growth. Excitement continued for the rest of the morning back there."

Through the 1944 season I put up dummy nests of several sorts, placing in them Bluebird (*Sialia sialis*) eggs from deserted nests and marked House Sparrow eggs. These eggs disappeared, but no Cowbird eggs were laid in the nests.

In 1945 I found Cowbird eggs in seven of nine Towhee nests in which eggs were laid in April and May. An early Towhee nest (eggs laid in March) was not parasitized. The earliest Cowbird eggs of that season I found April 6 (an egg in each of two nests, each egg laid April 4–6).

In mid-May of 1945 I noted much contention among the Cowbirds of the neighborhood. On May 16, I observed that the dominant 2M was limping. That morning there had been bowing ceremonies between him and two other resident males, 8M and 12M. Late that day his leg or foot trouble seemed aggravated, he sometimes lost his balance while feeding, and the plumage of his back was disarranged, the gray basal color showing as if some feathers had been lost. On May 17, an unbanded male spent considerable time at the feed-

ing plot. He and 2M participated in bowing displays to each other at their early meetings, but by evening 2M was doing all of the bowing. At 6:48 p.m. he directed eleven bows to the stranger and, a few minutes later, ten bows while he guarded his mate, 7F. The unbanded male made no response at all.

Early in the morning on May 18 a Cowbird egg was deposited in a Towhee nest in shrubbery near the feeding plot. The domain-holder, 7F, was in egg-production at that time. Early that afternoon 7F arrived at the feeding plot with her mate and an unidentified male. She appeared to be in normal condition then, but at 7:00 p.m., as she flew to a tree near by, I saw that she was tail-less, and when she alighted her posture was that of a sick or injured bird. She remained until 7:20, flying north, probably to the usual roosting place (all Cowbirds flew in that direction at dusk). The following day she made some effort to eat, but stood or squatted idly most of the time. At 7:39 p.m., when a Blue Jay annoyed her, she made a short flight toward the north, but dropped to the ground among some plants. Apparently this was her last flight. I did not see her again, and on the following afternoon (May 20), I searched among the plants, finding her intact body. She probably had died a very short time previously for ants had not yet attacked her eyes. She was thin, weighing only 36.4 grams, a low weight for a laying Cowbird. Dissection revealed an egg in the oviduct with the yolk intact but the shell broken. On the large end of the shell was a dark brown spot, bordered with specks of light brown, but the rest of the egg was immaculate. In the ovary were three enlarged yolks of varying sizes and a mass of tiny ova. It is possible that her condition was caused by the attack of a predator or by an automobile collision, but what I had actually observed the preceding few days led me to suspect that the Cowbirds themselves were responsible. The injuries of her mate and the behavior of the other males furnished circumstantial evidence that fighting involving the 2M-7F pair had been savage.

Summary

Through the breeding seasons of 1944, 1945, and 1946, at my home in Nashville, Tennessee, I studied the mating habits and territorial behavior of the Cowbird (*Molothrus ater*). My observations were principally of 29 color-banded individuals (18 males and 11 females), some of which lived about my home for two to four seasons.

Upon their arrival in spring, male Cowbirds indulged in elaborate bowing ceremonies, intimidation gestures, pursuits and fights, striving for dominance among themselves. These activities were connected more or less directly with mating. Intimidation gestures and fights of a similar sort occurred among females also. Bows extended in courtship or greeting by males to females were of various sorts, but none was as elaborate as that given by the male in intimidating another male.

One male became dominant among males, one female among females. I ob-

served copulation one to three times a season between these two dominant individuals, and I observed no other copulation. I did not ascertain whether the male acquired his domain first and then his mate, or vice versa, or whether the dominant female first selected her domain and then accepted as her mate any male which proved to be dominant in that particular area. My observations furnish greatest support for the last-stated theory.

The dominant pair held their dominance through the same intimidation displays as those practiced among the group early in the season. Most important of these in the male were the very elaborate "toppling forward" type of bow, the peck-gesture, the pointing upward of the bill, and the guarding of the female by moving quickly between her and another male. The female maintained dominance over other females by bill-pointing, peck-gestures, bowing (rarely), and guarding her mate from another female. Female display occurred less often than male display. With both sexes, intimidation gestures occasionally ended in a fight. Sexual jealousy was evident.

All of my observations indicated that the species was monogamous, although a number of individuals of both sexes mingled freely throughout the breeding season, feeding and flying about together.

I observed no evidence of true territorial behavior: no boundary lines were defended, and no Cowbirds were excluded from any area. The area (exact size undetermined) occupied by the dominant pair I have here designated as the *domain* because it was used as a mating station by the dominant male and dominant female exclusively.

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THE NATURE AND CAUSES OF THE 'COASTAL HIATUS'

BY GEORGE G. WILLIAMS

THE object of this paper is to re-examine the nature and causes of the so-called 'coastal hiatus' in the springtime migratory birdlife of our southern states. The hiatus lies along the northern shore of the Gulf of Mexico and extends several hundred miles inland. Within it transient birds are "extremely rare, highly intermittent in their occurrence, or even wholly absent during many consecutive spring migrations" (Lowery, 1945: 119). Cooke (1904: 378; 1915: 33), Chapman (1907: 17), Lincoln (1939: 50–51), and many other ornithologists aside from Lowery and myself have recognized this hiatus, and Lowery (1945: 119) believes it exists because transients arriving from across the Gulf "do not come down immediately on reaching land but fly far inland before descending."

On the other hand, I have maintained in two articles (1945; 1947) that evidence for large-scale trans-Gulf migration is lacking, and that, on the basis of the actual evidence at hand, we must believe that the really significant migrations from south of the United States "take the coastwise routes *around* the Gulf" through Florida and Texas.

One of the just-mentioned articles (1947) suggested, but for want of space and adequate evidence did not develop, certain independent hypotheses concerning the coastal hiatus. The present paper examines those hypotheses in the light of evidence accumulated in the intervening years.

Meanwhile, however, it should be said that Lowery has modified his original views about the hiatus. He now believes (he informs me) that the hiatus is more apparent than real; that trans-Gulf migrants actually do land in numbers within the hiatus, but are dispersed so widely and thinly over a very large area that they are seldom observed. Since the very nature of this particular hypothesis makes either verification or refutation impossible, the present paper must deal with it as only a part of the overall picture. The main difficulty with it is that incontrovertible evidence of large-scale trans-Gulf migrations is still lacking.

Confession of Error

Since writing the two papers mentioned above, I have been able to make telescopic observations of night migrants. These observations have been less extensive and regular than I could have wished. But since 1947 there has hardly been a clear moonlit night in April or May that I have not spent from one to four hours (as the press of other business permitted) from early in the evening till after midnight, and on two occasions all night long, observing migrants at Houston; at a place 10 miles southwest of Houston; on Galveston Island; on Matagorda Island; and at Rockport, Texas. Erratic as these observations have

been, they have amounted, all told, to many hours of work. They have convinced me that my original papers on trans-Gulf migration contained errors.

1. Both Lowery and I were impressed by the fact that spring migrants accumulate in great numbers along the Gulf coast during passage of a cold front, *no matter what hour the front strikes*. Accordingly, we agreed that spring migrations proceeded steadily and continuously (Lowery, 1945: 112; Williams, 1945: 108). Telescopic observations, however, do not confirm these conclusions. In the first place Lowery (whose telescopic work has been more extensive and consistent than mine) informs me that, normally, migration reaches a peak at certain hours of the night, and falls away sharply thereafter. And in the next place, I myself have noted that, on some nights during the spring migration along the Texas coastal plain, only 5 to 15 birds an hour will cross the moon's face; but on other nights they will pour across by the score—on one occasion (May 5, 1947) in such numbers during a two-hour period that, literally, they could not be counted.

This difference in the number of birds passing at different hours and on different nights requires that another explanation be found for the invariable accumulation of birds on the coast whenever a cold front passes.

2. Another seeming error in my original paper was its almost exclusive emphasis on coastline migration. Coastline migrations do occur. I have witnessed them repeatedly both by day and by night. The daylight migrations have involved many species and many individuals of land and water birds. Moreover, the coast undoubtedly forms a kind of sideline, as on a football field, which birds follow when unfavorable meteorological conditions make inland migration difficult.

But though the coastline migration exists, is vastly important, and must always be reckoned with, it is not exclusive. Telescopic observations have shown that, along the Texas coast, night migration may be very pronounced at least 50 miles inland.

Southern Migration Patterns

The number of individual migrants passing north along the lower Texas coastal area is simply incredible. Thus, Mrs. Conger Hagar and Fred M. Packard, in a study of birds in the Rockport-Corpus Christi area of Texas (the manuscript of which I have seen) speak of 500 Yellow-throats (*Geothlypis trichas*) counted together in a 100-foot row of young salt-cedars (*Tamarix*); 57 Bay-breasted Warblers (*Dendroica castanea*) in one tree and hundreds flocking through the adjacent area; 500 Tennessee Warblers (*Vermivora peregrina*) in a single day; waves of thousands of Baltimore Orioles (*Icterus galbula*) in a day or two; Scarlet Tanagers (*Piranga olivacea*) several dozen at a time; 50,000 Barn Swallows (*Hirundo rustica*) within two hours—and so on.

No such concentrations of birds have ever been reported in Texas outside the immediate coastal area. For example, at Austin and Dallas, regions well worked

by ornithologists, the very best days in the field produce hardly one-twentieth the number of individual birds of most migrant species appearing in the Rockport area. Furthermore, at least half the 65–70 transient species recorded as regular and abundant in the Rockport area in spring are listed as "rare", "uncommon", "scarce", or "irregular" at Austin (Simmons, 1925) and at Dallas (Stillwell, 1939). The same is true of the central Oklahoma region, about 500 miles directly north of Rockport (Nice, 1931). Finally, many species (the warblers in particular) that pass through the Rockport area do not nest, and seldom appear, in the Plains region northward from Rockport to Canada. It seems obvious, therefore, that all those birds which travel along the lower Texas coastal area in such vast numbers do not continue straight northward toward Austin, Dallas, central Oklahoma, and the Great Plains. What, then, does become of them?

The answer to the question is suggested by two facts: First, a large proportion of the land species transient through the Rockport area breed largely to the northeast of Rockport, in the wooded and mountainous regions of eastern North America. Indeed, the following species, all common transients through the Rockport area, breed entirely (or with minor and casual exceptions) east of the Rockport meridian: Wood Thrush (*Hylocichla mustelina*), Worm-eating Warbler (*Helmitheros vermivorus*), Golden-winged Warbler (*Vermivora chrysoptera*), Blue-winged Warbler (*Vermivora pinus*), Parula Warbler (*Parula americana*), Cerulean Warbler (*Dendroica cerulea*), Blackburnian Warbler (*Dendroica fusca*), Hooded Warbler (*Wilsonia citrina*), Canada Warbler (*Wilsonia canadensis*) and Louisiana Water-Thrush (*Seiurus motacilla*).

Second, telescopic observations in the general region about Houston show a huge majority of night migrants flying, not north, but northeast, or north-northeast. Except when cold fronts are imminent, observation at any given hour will show that 60% to 90% of all birds seen are traveling northeast, or north-northeast. This is true of any date in April or May, or any hour of the night. All told, the average of birds traveling in this direction in any one hour is about 80% of the birds actually seen. A good typical night, in the midst of an extensive period of warm, bright weather, was May 3, 1947, when I used the telescope 2 hours and 15 minutes between 7:45 and 10:45 p.m. Birds seen were as follows: 3 going north, 2 going northwest, 5 going southwest, 47 going between east and north-northeast.

These two circumstances seem to allow of no other interpretation than that the birds passing so abundantly through the Rockport area must fan out, as they proceed, in a great triangle like that indicated in Figure 1.

But this triangle is not necessarily rigid, as it appears to be in the figure. An aggregate of hundreds of daylight observations, as well as a few nighttime observations, suggest that the triangle may waver from side to side. The push of a cold front on the northwestern edge of the triangle may compress it against the coast, where it coalesces with the regular coastwise migration. Or the flow

of warm air from the south, with clear weather to the north, may swing the triangle far to the northward. Or various combinations of meteorological factors may affect it in other ways.

That this western triangle of migration exists seems certain. Whether there is a corresponding triangle extending up from Florida has never been investigated. Lowery tells me that its existence is not confirmed by the small amount of telescopic evidence now at hand. But if such a triangle exists, it must involve fewer species and fewer individuals (Williams, 1945: 103) than those of the western triangle.

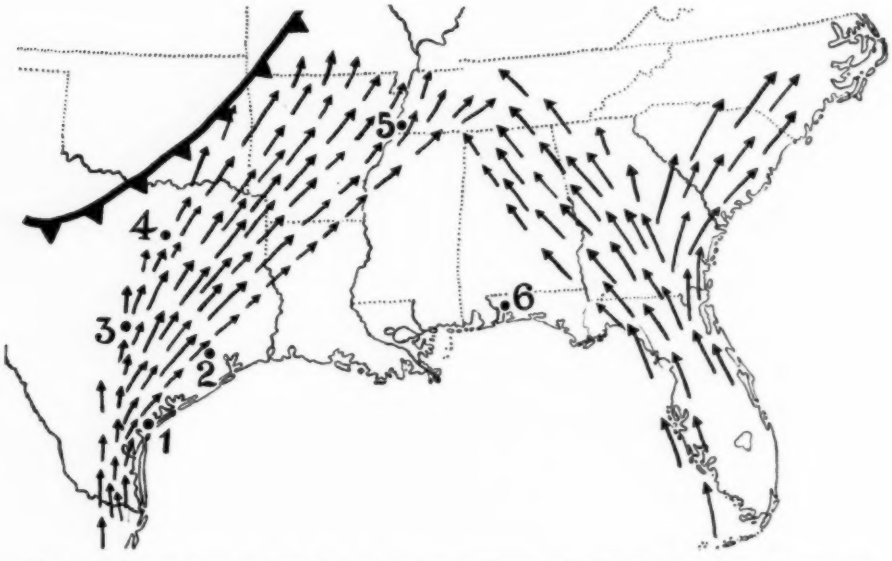

FIG. 1. Map to show spring bird migration patterns through the Southern States. The 'coastal hiatus' is obvious. The heavy barbed line across the northwest represents a typical cold front advancing toward the southeast. Places mentioned in the text: 1. Rockport; 2. Houston; 3. Austin; 4. Dallas; 5. Memphis; 6. Pensacola.

Nevertheless, when one recalls that certain species generally recognized as entering North America almost exclusively through Florida in spring breed in areas extending far to the northwest, north, or northeast of Florida, it seems probable that the eastern migration triangle exists for a few species at any rate, and perhaps for some individuals of many species. Birds in this category are the Cape May Warbler (*Dendroica tigrina*), Black-throated Blue Warbler (*Dendroica caerulescens*), and Bachman's Warbler (*Vermivora bachmanii*), and probably the Swainson's Warbler (*Limnothlypis swainsonii*), Kirtland's Warbler (*Dendroica kirtlandii*), Prairie Warbler (*Dendroica discolor*), Black-poll Warbler (*Dendroica striata*) and Bobolink (*Dolichonyx oryzivorus*). It is interesting that, according to Weston (1938: 222), the area 50–60 miles from the

Gulf inland from Pensacola has a more nearly "normal" migration than Pensacola itself. This is what we should expect if the eastern migration triangle exists. Furthermore, Weston has repeatedly remarked, in his reports from Pensacola appearing in *Audubon Field Notes*, that Swainson's, Cape May, Black-throated Blue and Black-poll Warblers, as well as the Bobolink, are rare "this far west"; yet all these birds are recorded as common spring migrants through Georgia (Greene et al., 1945). Again, this is what we should expect if the eastern migration triangle does exist.

The Coastal Hiatus

If the two migration triangles just mentioned really exist (and the western one certainly does), the coastal hiatus postulated by Cooke (1904) long ago, and described by Lowery (1945) more recently, is that land area which lies south of and between the two migration triangles.

Lowery's description (1945) outlined three characteristics of the hiatus: (a) Along the Mississippi Valley "the northern edge of the hiatus must lie to the south of Tennessee"; the southern edge lies along the coast (p. 106). (b) Many transients "are recorded consistently much earlier in Tennessee, for example, than on the coast itself" (p. 103). (c) The number of individuals and of species recorded within the hiatus "do not seem to approach those recorded slightly farther north" (p. 106); the region about Memphis, Tennessee, in particular, "throngs day after day with migrants" (p. 106).

The hypothesis of the two migration triangles fits this three-fold characterization like a glove. Specifically, (a) birds traveling along the two triangles would not enter the region of the hiatus except under the push of unfavorable weather northward from the triangles. (b) In good weather (warm and clear) they would reach Arkansas, Tennessee, Missouri, Kentucky, and northern Mississippi, northern Alabama, and northern Georgia before appearing within the hiatus. (c) The numbers of individuals and of species traveling along the triangles would be greater than the number that normally entered the hiatus.

Transients in the Hiatus

1. *Arrival Dates.*—Weston (1948) points out that during 30 years of observation at Pensacola, Florida, he has consistently "recorded 'first arrivals' here in spring on dates that afterward proved to be later than the bulk arrival date of the same species at some point much farther north." Likewise Lowery (1945) has shown that a large percentage of transient species have been recorded earlier at Memphis, Tennessee, than at Baton Rouge, Louisiana, or anywhere on the Gulf from Pensacola to western Louisiana. The traditional explanation has long been that trans-Gulf migrants during good weather "pass over the Gulf coast in the spring and proceed far inland before descending" (Lowery, 1945: 103).

This explanation might accont for the phenomenon. But it requires our

believing that tiny land birds would fly at least 950 miles (the south-north distance from Yucatán to Memphis) without stopping, and 400 miles after their first landfall. Lowery suggests (1946: 205) that some of the migrants begin their flights from southern Yucatán, or "points even farther south." The non-stop flight to Memphis might thus cover about 1200–1300 miles.

Though the 500–600 mile flight across the Gulf itself is not impossible, the longer distances involved seem fabulously great for the regular migrations of small birds. The two migration triangles here described offer a much more logical and credible explanation of those good-weather discrepancies that have long been noted in arrival dates.

2. *Bird Waves.*—All along our Gulf coast the arrival of a cold front in spring is almost invariably accompanied by the appearance of hosts of migrants in the immediate coastal area. Weston in Florida, Burleigh (1944) in Mississippi, Lowery (1945) in Louisiana, and all observers on the Texas coast are familiar with this spectacular phenomenon. The traditional explanation of these bird waves is that migrants coming in from off the Gulf meet the cold front and, unable to make headway against it, accumulate on the coast and wait for it to pass.

At this point the reader's attention should be called to the fact that birds migrating in spring may retreat long distances with, or ahead of, a cold front. This phenomenon has been analyzed in some detail in a recent paper (Williams, 1950).

What seems to happen, during the passage of a cold front, to the birds migrating along the western triangle is this: they are struck on their port beam by the cold front coming, usually, out of the northwest or north-northwest. They veer off-course, and fly with the front, or ahead of it, toward the east or southeast. That is, they invade the coastal hiatus. But they do not usually stop within the hiatus itself; they press on till they see the waters of the Gulf ahead of them. Fearing to be swept out to sea, they plunge to earth and "pile up" there. Some of them may even be swept out to sea in the darkness, and return to land the next morning. Or perhaps, being crowded between the cold on the left and the sea on the right, they struggle eastward in a narrow column, hugging the coast, till the cold abates; then they turn and resume their flight directly toward their original destination. In any event, the number of individuals that appear on the coast is tremendous because the whole width of the migration triangle, with its vast numbers of migrants, has been swept clean, and the birds compressed into the narrow coastal area.

This intrepretation of the coastal concentrations is consistent with the following facts:

(*a*) The concentrations appear on the coast, no matter what hour the cold front strikes.

(*b*) The concentrations appear not merely, or even largely, in our coastal area opposite Yucatán (as would probably be the case if the birds had arrived from across the Gulf), but in the entire coastal area from Brownsville, Texas, to

Pensacola. This wide dispersal along the coast is what we should expect if the interpretation here offered is sound.

(*c*) Even when a cold front advances from almost due west, as sometimes happens, a concentration of birds will occur on the southern Texas coast. Moreover, some of the species involved—for example, the Hepatic Tanager (*Piranga flava*), Violet-green Swallow (*Tachycineta thalassina*), White-throated Swift (*Aëronautes saxatilis*), and Black-chinned Hummingbird (*Archilochus alexandri*)—have never been regarded as trans-Gulf migrants.

(*d*) Only occasionally (about once every spring) does a cold front strike the Gulf coast from the northeast. Accordingly, the characteristic birds of the eastern triangle (Cape May, Black-poll, Black-throated Blue, and Prairie Warblers, and even the Bobolink) are much more rare along the coasts of Texas, Louisiana, Mississippi, and the northwestern arm of Florida than are birds of the western triangle; and when these eastern birds do appear, they nearly always accompany one of the rare northeastern fronts. Furthermore, these birds of the eastern triangle become progressively rarer as we move westward along the coast; and conversely, characteristic birds of the western triangle become progressively more scarce as we move eastward along the coast (Williams, 1945: 103). These peculiar, but regular, diversities would not occur if the birds were coming from across the Gulf.

3. *Birds on the Gulf of Mexico.*—Vagrant land birds are seen rather commonly on all the world's seas (Williams, 1947: 229–231). I have records of Blue Jays (*Cyanocitta cristata*), Starlings (*Sturnus vulgaris*), Towhees (*Pipilo erythrophthalmus*), Brown Thrashers (*Toxostoma rufum*), and other species *not* migratory to regions south of the United States, coming aboard ships 30–150 miles out in the Gulf of Mexico, as well as a banded homing pigeon (from San Antonio, Texas) released in New Orleans on June 4, 1949, and coming aboard a ship, 50 miles south of Cameron, Louisiana, on the morning of June 6.

But I have investigated every report known to me concerning *numerous* birds on the Gulf of Mexico in spring. Invariably (and I wish to emphasize the *invariably*) a cold front had passed out over the Gulf within, at the very most, 36 hours before the time when the birds were reported.

It had long seemed to me that these birds had been swept out to sea by the cold front, and were struggling back to land when seen; that they were *not* trans-Gulf migrants. Having had no experience with birds on the Atlantic coast, I was surprised to find that Peterson (1948: 161) described the very same phenomenon on the Atlantic coast, where trans-oceanic migration is out of the question. Telling of autumn migrants at Cape May, New Jersey, Peterson described the effect of "a northwest wind blowing across the traditional lanes of travel of birds moving southward." He continued: "The birds drift southeastward in the moving mass of polar air, and if the wind is strong enough, the night migrants are carried out to sea in the darkness. At daybreak, near the Cape May Light, I have watched small birds, weak and tired, beating their way in over the surf, tacking into the stiff northwesterly breeze that had car-

ried them offshore." Similar refugees on our Gulf coast have long been called trans-Gulf migrants. Much more probably, they are birds that cold fronts have pushed across the coastal hiatus and out to sea.

Summary

The 'coastal hiatus' of our Gulf States appears to be a lacuna south of and between two great spring migration triangles, one extending north and northeast from southern Texas, the other extending northwest, north, and northeast from Florida. In this lacuna few transient species occur during fair, warm weather.

Periodic cold fronts, with northerly winds, striking the northern sides of these migration triangles, push migrants down against the coast, where they are often seen in great numbers immediately after the passage of a cold front. Sometimes the cold fronts push birds out over the Gulf itself, where they have been mistaken for trans-Gulf migrants.

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NESTING OF THE STREAKED FLYCATCHER IN PANAMA

BY ALFRED O. GROSS

ORNITHOLOGISTS who visit the high mountains of southern Arizona in summer are apt to see and hear the Sulphur-bellied Flycatcher (*Myiodynastes luteiventris*), a noisy, quarrelsome bird which seems to prefer sycamores to other trees (Bent, 1942: 99–106). This flycatcher is the most northward-ranging form of its genus. Another species of the same genus, *Myiodynastes maculatus*, the so-called Streaked Flycatcher, is not known to range farther north than the Río Sabinas, in southwestern Tamaulipas (Sutton, Lea and Edwards, 1950: 51). It has never been recorded in the United States. It ranges southward through eastern México, Costa Rica, Panamá, Colombia, and Ecuador to northwestern Venezuela and extreme northwestern Perú—and even farther east and south if the closely allied *M. solitarius* be considered conspecific with it. The Sulphur-bellied and Streaked Flycatchers are amazingly alike in size and color. There may be differences in behavior, nesting habits and call notes between them, but these differences have never been reported adequately. Since the Streaked Flycatcher nested commonly on Barro Colorado Island in the Canal Zone during my visits there in 1925, 1927, and 1949, a report of my observations may be of interest and value.

The usual nest-site of the Streaked Flycatcher is a natural cavity or old woodpecker hole (Aldrich and Bole, 1937: 101). At Barro Colorado these are often so far above the ground or water as to be virtually inaccessible to a human being. When, during the construction of the Panama Canal, the Chagres River was dammed and Gatun Lake formed, hundreds of great trees were drowned. In 1925 and 1927 many of these trees were still standing. The soft, decaying wood had been easy to excavate, and innumerable nest-holes had been dug by woodpeckers. The abandoned woodpecker holes were used by such cavity-nesters as the Streaked Flycatcher. The only Streaked Flycatcher nests I found those two seasons were in dead trees standing in the lake. In May of 1935 Alexander Skutch observed two such nests in the lake. As the trees have rotted they have fallen. Not many of them are still standing. In 1949 so few were left that the Streaked Flycatchers were obliged to nest elsewhere. At least one pair coped with the hole-shortage by nesting on a roof. This pair I observed repeatedly from June 28, the day of my arrival, to July 27, the day of my departure.

No one knows, of course, how long that particular pair had been nesting about the buildings. Twenty-four years before, in December of 1925, Frank M. Chapman (1929: 59) had observed a pair at an old woodpecker hole high in a dead tree near the laboratory. That tree had fallen and where it had stood a house

for visiting scientists had been built. In 1935 Mr. Skutch had watched a pair of Streaked Flycatchers trying to build a nest on a window-sill of that house, but the loosely piled material had continued to blow away or fall off, so he had put up a box for them. Here they had promptly built a nest, laid three eggs, and raised a brood. The partly completed nest which I found on June 28, 1949 was not the only visible evidence that Streaked Flycatchers had been nesting about the buildings. On the roof of a house not far from the one in which I lived I found the remains of a nest possibly a year old.

The new nest was on the gently sloping metal roof of a porch on the east side of the house, close against the wall and tucked in under the ample overhang of the main roof. The early morning sun reached the nest, but during most of the day it was shaded, and the overhang of the eave sheltered it from the frequent torrential downpours. When I first examined it, it was a small mass of scattered twigs—the mere beginning of the foundation. The two birds came and went together, but I noticed that I never saw both birds carrying material at the same time. The coloration and size of the male and female were exactly the same so far as I could see. Each time the carrier of material flew in, the other bird came also—but never quite to the nest. Instead it veered off, took a perch in a nearby partly-dead orange tree, and remained on guard while the other cautiously went to the nest and added the material. This accomplished, both birds flew off together. Rarely did one bird come to, or leave, the nest alone.

By July 1 the nest was a substantial mass of material. The top was horizontal but the bottom sloped with the roof, so the outer (east) side was somewhat higher than the inner. The cup was quite deep. The birds made trip after trip to a large tree growing about 75 yards from the house in a ravine. Here one bird gathered material while the other perched in the very top. The gatherer of material, assumed by me to be the female, worked at the ends of the branches, tugging at and pulling off slender curved stems, some of which may have been dry petioles. These she shifted about in her bill as the load grew. Sometimes, with mouth full, she waited a while before leaving the tree. Once more at the nest, she stood in the cup while arranging the material. Between 8 and 11 o'clock that morning material was brought to the nest once about every 15 minutes. In the middle of the day the birds took a recess. They did not resume their nest-building until late afternoon.

On July 2, work started at 7:15 a.m. In addition to coarse twigs for the walls, finer twigs and tendrils for the lining were being gathered. At 8:43 a.m. the bird I assumed to be the female alighted on the edge of the roof with 6 or 7 long fibers in her bill. Apparently scrutinizing her surroundings, she stood there for two minutes, then flew directly to the nest, alighting in the bowl itself. Here, instead of dropping her load, she moved her head from side to side, letting the dangling fibers fall between her body and the nest wall. She made no attempt, so far as I could see, to adjust their position with her bill. Now, lifting her wings and tail, she pressed the fibers into the nest with her breast. Shifting

and turning, sometimes going about in a complete circle, she forced them into place. Then, with wings folded and tail stuck upward so that it touched the overhanging roof, she rested, panting hard. The heat must have been intense, for at that hour the roof was not shaded in the slightest. Five times that morning I observed this pressing into the lining of a load of fibers. The procedure was essentially the same each time. About noon nest-building stopped for the day.

Streaked Flycatcher (*Myiodynastes maculatus*) on favorite perch near nest. Photographed on Barro Colorado Island, Panama Canal Zone, in July, 1949, by Alfred O. Gross.

On July 3 the sky was cloudy and the weather cooler. Possibly as a result of this, the birds were very active. I first saw a bird at the nest at 7:46 a.m. Observing continuously from that time on, I recorded arrival with nest material at 8:15, 8:19, 8:24, 8:27, 8:34, 8:40, 8:46, 8:52, 8:59, 9:06, 9:14, 9:22, 9:30, 9:38 and 9:45. The average time-lapse between these 16 recorded visits was about 8 minutes. After 10 o'clock that morning visits were less frequent, but they continued even during a light shower. The birds did not seem to be disturbed in the least by workmen who walked in front of the house, nor did they

pay much attention to a group of White-faced Monkeys (*Cebus capucinus*) which fed and frolicked in a tree not far away.

I noted no striking courtship behavior of any sort that day. While the female was coming in with nest material I did see the pair copulate, however. Thus I ascertained that the female was doing the nest-building *at that time*. I saw the male lift his crest after copulating, revealing the usually concealed bright crown-patch, but this hardly seemed to be a definite display. I failed to note any individual peculiarity through which I might hope to be able to distinguish the male from the female thereafter. Occasionally, that day, one bird arrived at the nest without an escort. I assumed this bird to be the female. Evidently ill at ease, she flitted about calling nervously until her mate appeared and took his usual position in the partly-dead orange tree.

Nest-building continued on July 4 and 5, but trips for material seemed to be less frequent. The only material now being brought was long, fine, reddish brown plant fibers. These the female (?) continued to press into place with her body (possibly to some extent with her feet), making no attempt to weave or interlace them with her bill. She turned and shifted a great deal, molding the cup to exactly the right shape. As a whole, the nest was rather flimsy. It was spread over an area about 18 by 20 inches. Its greatest actual over-all depth (not allowing for the slope) was $4\frac{1}{2}$ inches. The cup or bowl was $3\frac{1}{8}$ inches deep and $3\frac{1}{4}$ inches in diameter at the rim. The only lining materials were long, thin plant fibers. The wall and foundation materials seemed to slip out of place easily. Had the nest been in a cavity it probably would have remained more compact.

On July 6 the birds were in the trees and shrubbery about the laboratory, but I did not see either of them at or near the nest. During a heavy rain in the afternoon I saw them perched together in a blossoming *Isertia* bush with their plumage plastered down and their bills directed upward toward the falling drops. After the shower they flew up to an electric cable where, side by side, they dried and preened for 25 minutes. They paid no attention to persons passing only a few yards away. They seemed to be half-domesticated.

At 7 a.m. on July 7 the female was on the nest and the male was in a tree not far away chirping and singing. In his bill was a long fiber. He did not, however, fly with this to the nest. This was the only time I saw what I felt reasonably sure was the male carrying nest material. The female remained on the nest all morning. When I visited the nest after her departure it held one egg.

On July 8 there were two eggs in the nest at 11 a.m., and I assumed that the clutch was complete when none was added the following day. On each of my visits to the nest I made a point of waiting until the birds were out of sight, but by the time I climbed to the roof both had returned. They attacked fiercely, swooping at me and striking my head with their wings. As soon as I left the nest and got down from the roof, however, they seemed to pay no attention to me or to other persons who walked about the building.

On the morning of July 10 I was surprised to find a third egg in the nest.

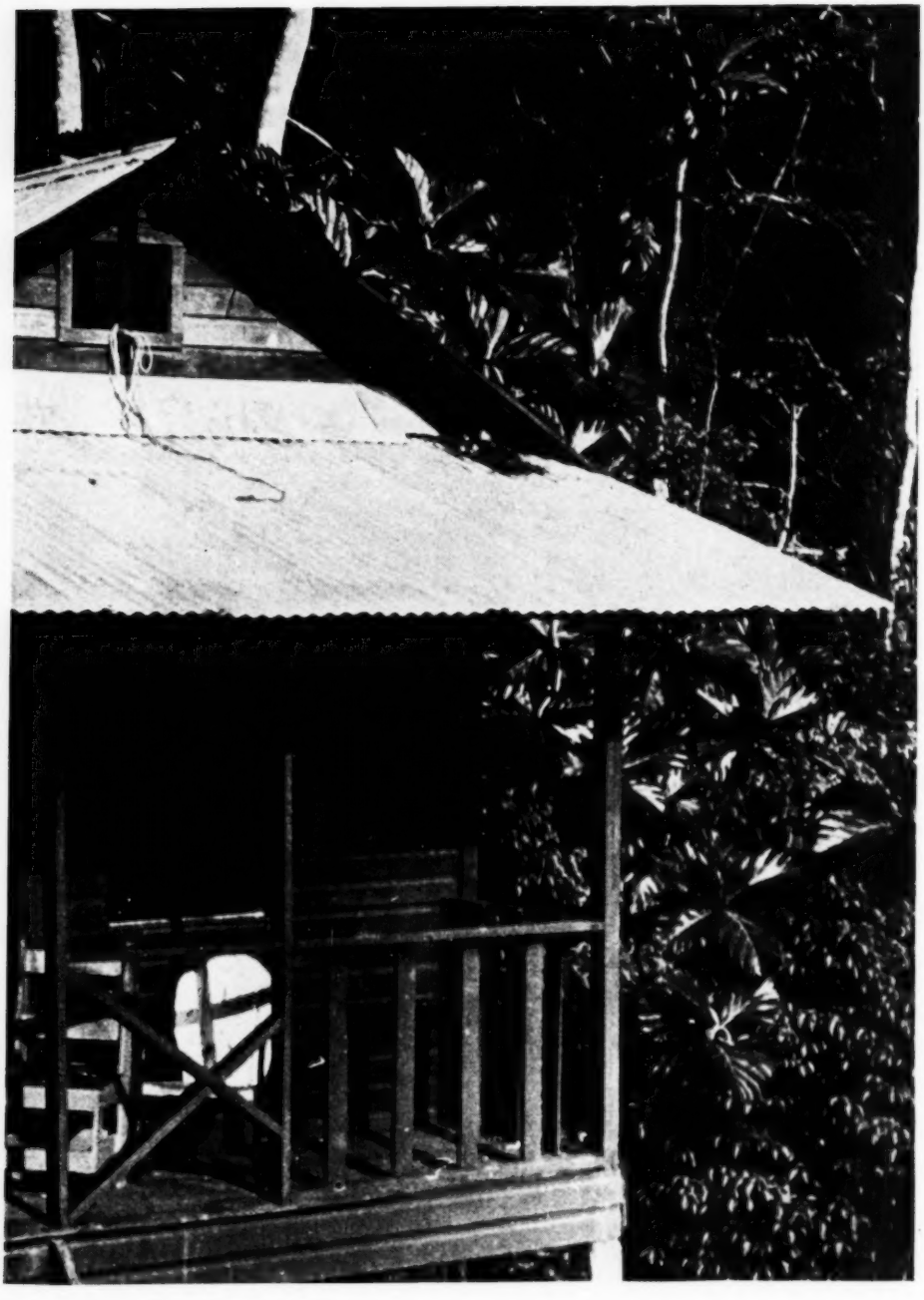
The female made short visits to the nest that morning and early afternoon, but she did not seem to settle down to actual incubation until late afternoon. She was on the nest at dusk and remained there during the night.

On July 11 the female was on the nest (so far as I know) continuously until 10:30 a.m., at which time she left the nest with the male and went off to feed. The day was warm. The birds did not return until 1 p.m. The *female* went to the nest almost immediately and settled down to incubating. The *male* remained in his favorite orange tree, perching near the top and preening vigorously. At 4 o'clock the female left the nest, returning presently with several

Nest and eggs of Streaked Flycatcher. Photographed on Barro Colorado Island, Panama Canal Zone, in July, 1949, by Alfred O. Gross.

fibers in her bill. She alighted near the male and, without any courtship or display that I could see, the pair copulated. Still holding the fiber in her bill, the *female* now flew to the nest, placed the material somewhat casually on the rim, and settled upon the eggs, resuming her incubation.

At 4:45 a Ghiesbrecht's or White Hawk (*Leucopternis albicollis*) flew low across the clearing, heading for a stump just south of the laboratory. The male Streaked Flycatcher instantly left his perch in the orange tree and dashed at the hawk, causing it to change its course completely. It alighted in a cecropia tree. Here, shrieking in protest, the smaller bird continued for about twenty minutes to give battle. Finally, nagged and badgered to the edge of the clearing, the



Nesting site of Streaked Flycatcher on metal roof, Barro Colorado Island, Panama Canal Zone. Photographed in July, 1949, by Alfred O. Gross.

hawk left, and the flycatcher returned to his post in the orange tree. Despite all the commotion, the female flycatcher had remained on the nest. The male's attitude toward the hawk surprised me somewhat, for he had paid no attention to the many tanagers, honey creepers, cotingas and other birds which visited his orange tree from time to time. I had seen even a Tropical Kingbird (*Tyrannus melancholicus*) alight only a few inches from him on his favorite branch without causing an altercation.

On July 12, while I was measuring the eggs on the roof, the flycatchers attacked me more fiercely than usual. One of them dashed at my hand, striking the metal calipers so hard that a mass of feathers was dislodged. No great harm was done, however, and the attacks of both birds continued unabated. The excitement died down completely as soon as I left the roof.

On July 12 and 13 there were only three eggs in the nest, so I judged the clutch to be complete. The eggs were strikingly and beautifully marked. Their ground-color was very Pale Olive-buff[1], almost white. Over their entire surface, but especially at the larger end, they were streaked and blotched with reddish brown. The shade of most of the markings was about Van Dyke Red. At the larger end, where the ground-color was almost completely obscured, the markings varied from Hays Maroon to Diamine Brown. The eggs measured (in millimeters) and weighed (in grams) as follows:

	Longest diameter	Shortest diameter	Weight
1	23.0	19.1	4.65
2	22.8	18.9	4.59
3	24.2	19.5	4.72
Average	23.3	19.2	4.65

Skutch (1945: 19) gives the average measurements of three eggs as 27.7 × 18.6 mm. These were the eggs of Costa Rican or Panamanian birds. Three *Myiodynastes luteiventris* eggs collected along the Río Sabinas in Tamaulipas averaged 25.5 × 18.6 mm. (Sutton, Lea, and Edwards, 1950: 51).

On July 16 (the eggs had now been incubated 5 full days), the female left the nest at 1:45 p.m. and, accompanied by her mate, flew to the trees bordering the farther side of the clearing. I saw neither bird again until 5 p.m., when both returned to the partly-dead orange tree. Presently the female went to the nest. The eggs had been uncovered for over three hours, but to say that they had not been incubated at all during that time would be to disregard the heat of the day and of that particular under-the-metal-roofing nest-site.

On July 17 the female was away from the nest from 10 a.m. to 2 p.m. and again from 4:15 to 5 p.m. On July 18 she was away from the nest from 6:30

[1] Capitalized color-names used in this paper are from Ridgway's *Color Standards and Color Nomenclature* (1912).

to 9:10 a.m. and from 10:30 a.m. to 1:30 p.m. A heavy rain from 3:05 to 3:30 p.m. did not seem to disturb her in the slightest.

On July 22 (the eggs had now been incubated 11 full days) I decided to observe the nest continuously all day. I started at 6 a.m. At that time the female was on the nest. My log for the day is shown in Table 1.

During the tabulated 12 hours and 45 minutes (see Table 1) the female was on the eggs a total of 5 hours 43 minutes, off them a total of 7 hours 2 minutes, this on the 12th day of incubation. Incubation continued July 23 and 24. On both these days the female was off the nest for considerable periods, but I did not record her comings and goings. Throughout the entire 15-day incubation period she was, so far as I know, on the nest continuously each night.

TABLE 1

ATTENTIVE AND INATTENTIVE PERIODS AT NEST, TWELFTH DAY OF INCUBATION

	On Nest	Off Nest
6:00 a.m.– 6:20 a.m.	20 min.	
6:20 a.m.– 9:30 a.m.		3 hrs. 10 min.
9:30 a.m.–10:35 a.m.	1 hr. 5 min.	
10:35 a.m.–10:40 a.m.		5 min.
10:40 a.m.–10:42 a.m.	2 min.	
10:42 a.m.–11:15 a.m.		33 min.
11:15 a.m.–11:19 a.m.	4 min.	
11:19 a.m.–11:45 a.m.		26 min.
11:45 a.m.–11:57 a.m.	12 min.	
11:57 a.m.–12:22 p.m.		25 min.
12:22 p.m.–12:56 p.m.	34 min.	
12:56 p.m.– 3:00 p.m.		2 hrs. 4 min.
3:00 p.m.– 6:26 p.m.	3 hrs. 26 min.	
6:26 p.m.– 6:45 p.m.		19 min.
6:45 p.m.	returned to nest for night	

Each time I paid the nest a nighttime visit the female was there and I was surprised at her staying on the nest despite the noise, the considerable vibration of the roof, the flashlight, and the flash-bulbs used in photography.

On July 25 I went to the nest at 8 a.m., finding one egg hatched (the shells had been removed) and another pipped. The parent birds seemed to be more excited than they had been at any time during the incubation period. Until about 9 o'clock the sun struck the nest directly. During much of this early morning period the female stood on the nest-edge shading the young bird and hatching egg. At 9:23 the male brought food (presumably soft-bodied insects), fed the young one directly (i.e., without passing it first to the female) in several small installments, and returned to his orange tree, there to utter *cheer-o-wee-wee*, one of the more musical of his cries. The female now settled on the nest.

The heat was intense. As she panted I noticed the deep red color of her tongue and the yellow of her mouth-lining. Having brooded her eggs and young one a few minutes she hopped up to the nest's rim, peering at the young one and poking her bill among the eggs and young as if expecting a fecal sac to appear. At 10 o'clock both flycatchers flew off for a short time. On coming back, they took turns in feeding the young one. The male now flew to his orange tree, but the female stayed at the nest. From noon until 2 p.m., rain fell. During this time the female was on the nest, brooding closely. At 2:15 I saw her removing some egg-shells. The second egg had hatched. The male flew to the nest with food. Between feedings he uttered curious gurgling notes. These were faint, but quite distinct, and very different from his song and usual call notes. The third egg did not hatch. On examining it later, I found that no embryo had developed in it.

The down of the young birds was Blackish Slate on the top of the head, between Mouse Gray and Deep Mouse Gray on the upper part of the body, and virtually white below. I noted that there were two tufts in the middle of the crown as well as one above each eye; tufts on the nape, and scapular, humeral and femoral regions in addition to the extensive spinal tracts, and an elongate tract on each side below. The naked parts were Flesh Color, the tarsus and toes Pinkish Vinaceous, the claws Cartridge Buff and the gape Pinard Yellow. Skutch (in Bent, 1942: 102) described the natal plumage of the closely allied *Myiodynastes luteiventris*, as he had observed it in Costa Rica, as "rather copious, long, dusky down."

Unfortunately I had to leave Barro Colorado on July 27, so I could not continue my observations of the nestlings. Dr. James Zetek and his assistants continued to watch them however, ascertaining that they left the nest at 11 a.m., on August 12, when they were 18 days old. Skutch (1945: 19) gives the nestling period as "at least 21" days. The Barro Colorado birds may have left the nest somewhat prematurely.

Call notes of *Myiodynastes maculatus*

The Streaked Flycatcher has been described as a noisy bird (Todd and Carriker, 1922: 345), but what I observed on Barro Colorado did not substantiate this concept except when I climbed to the nest. Excited by my presence there, the pair uttered loud screaming notes. The usual call notes were chirps not unlike those of the Song Sparrow (*Melospiza melodia*), but louder and with a distinct metallic quality. Both the male and female gave this call note. When one gave it the other usually answered with the same note. Occasionally I heard them give a loud *witchy, witchy*.

The song, which is sometimes preceeded by 'sparrowlike chirps', and which probably is given only by the male, was so unlike what I had expected that for some time I could not believe *Myiodynastes maculatus* was giving it. It was a

series of subdued, pleasing, rather high-pitched notes which I wrote down as *cheer-o-wee-wee, cheer-o-wee-wee, cheer-o-wee-wee.* I heard this song throughout the period of my observations of the roof-nest in 1949, and I heard it at various times of day. It was usually given from a high perch. Skutch, in unpublished MS notes pertaining to a song of the species he heard on Barro Colorado in July 1931, says: "the bird perched on the top of a tall tree in a clearing, and at dusk began to sing. It was a pleasing, simple melody, clearer and softer than possessed by most flycatchers: a half-whistled, sweet *Right-here-to-me, Right-here-to-me, Right-here-to-me.*" An early morning *Myiodynastes* song reported from the Río Sabinas, in Tamaulipas, and El Salto, San Luis Potosí, was four-syllabled, as were the *cheer-o-wee-wee* and *right-here-to-me* songs just described (Sutton, Lea, and Edwards, 1950: 49).

Food Habits of *Myiodynastes maculatus*

In mid-July, 1949, I noted repeatedly that the Streaked Flycatchers whose nest I was observing seemed to ignore the clouds of small brown dragonflies which were all about them. They centered their attention, apparently, on smaller, more delicate insects.

On July 24, 1949, I saw a Streaked Flycatcher kill and eat a three-inch-long lizard. Holding the struggling reptile in its beak, the bird struck first the head-end, then the tail-end of its victim against the branch on which it was perched, ran the numbed lizard rapidly through its bill, transferred it to its feet, dealt it several blows with its bill, and started swallowing it. With the lizard half-swallowed, the flycatcher rested momentarily, letting the limp tail protude. Finally, with a violent shaking of its head, it got the lizard down.

These lizards were numerous in latter July. I often saw them on the screens of the buildings. On July 25, while making observations at the nest of a Hicks' Seedeater (*Sporophila aurita*), I saw a Streaked Flycatcher alight on the ground under the nest-tree, capture a lizard, fly to a low dead branch and batter the animal to death. Killing or numbing the lizard sufficiently for ingestion required four minutes. Twenty minutes later I saw the same bird catch and eat another lizard in the same way.

Summary of Nidification Data

A Streaked Flycatcher nest, started on or about June 28, was not entirely finished on the evening of July 5, but very little work was done on it the following day and the first egg was laid July 7. Time required for building: about 8 days.

One bird seemed to do all the gathering of material and actual building and I believe this was the female. On one occasion I witnessed copulation and the female had nest-material in her bill at that time. On another occasion, however, when the supposed female was on the nest, the other bird had a fiber in its bill. The other bird did not add this fiber to the nest.

The first egg was laid July 7, the second July 8, the third July 10. Incubation apparently did not start until the afternoon of July 10, but it may have started earlier. I am not sure that a bird spent the night on the nest during the egg-laying period. On the evening of July 10, however, a bird was on the nest and it spent the night there.

On July 11 (her clutch was complete) the female added a billful of material to the nest. I believe the female did all the incubating. I never saw the incubating bird being fed at the nest by the other. I never saw two birds at the nest together during the period of nest-building, egg-laying, or incubation.

Only two of the eggs hatched. They hatched July 25. Incubation period: at least 15 days, possibly more, since it may have been the egg laid July 10 that did not hatch.

Both parent birds fed the newly hatched young directly—i.e., the food was not passed from one parent to the other before being given to the young. The young remained in the nest until August 12, being fed by both parents throughout this period. The young may have left the nest prematurely. Fledging period: at least 18 days.

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TERRITORY AND SONG IN THE LEAST FLYCATCHER

BY PEGGY MUIRHEAD MACQUEEN[1]

DURING the summers of 1942, 1944 and 1946, I made an intensive study of the Least Flycatcher, *Empidonax minimus*, in the vicinity of Douglas Lake, Cheboygan County, Michigan. My study covered a total of 44 nests: 19 in 1942 and 14 in 1944 on an area of 7 acres of broken aspen woods (i.e., woods in which there were several houses, roads and paths) within the Biological Station camp grounds; and 11 in 1946 on the same 7 acres plus 14 adjacent acres of unbroken aspen woods (i.e., woods without houses, roads and paths).

Techniques

The study area was systematically searched for nests, which were numbered approximately in the order found. Their position and the territorial boundaries of the nesting pairs I have indicated on maps for the three years studied (see maps).

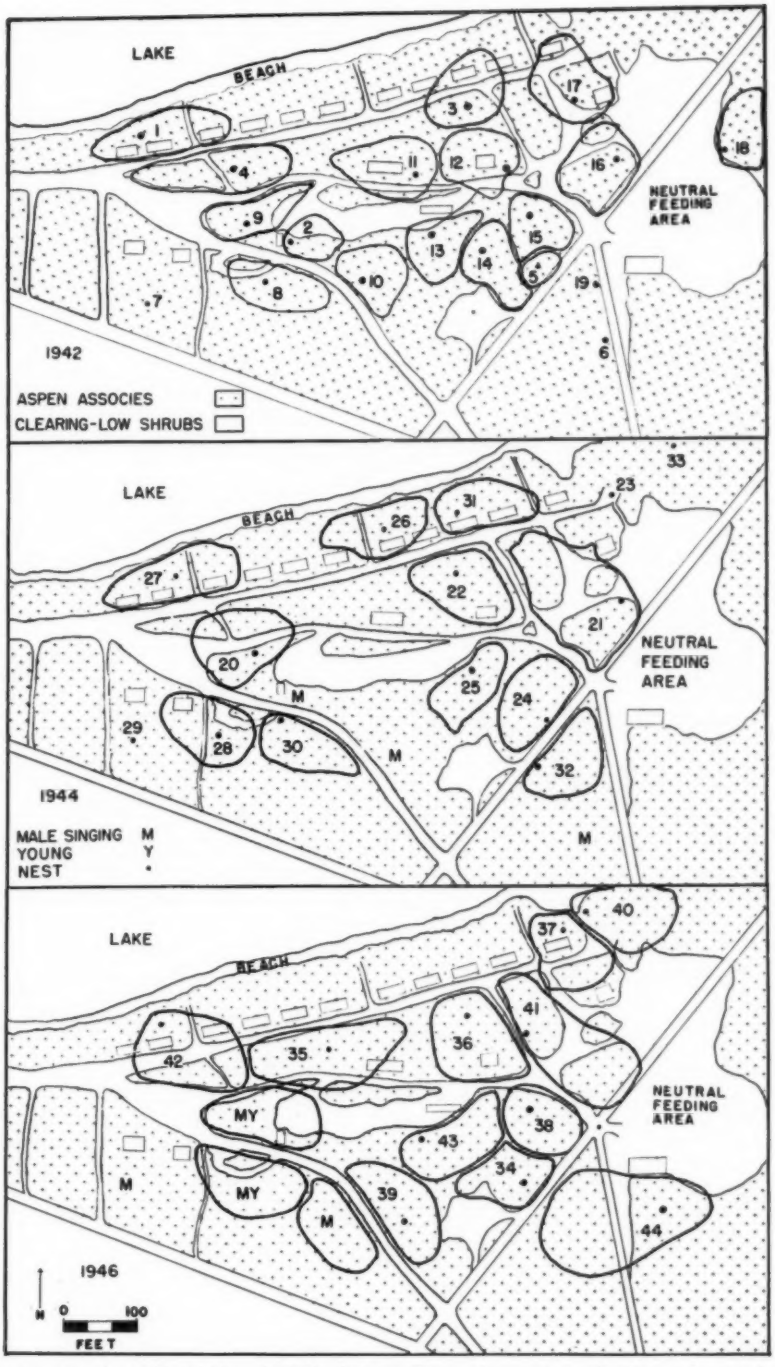
Nests 1, 2, 3, 4, and 5 were observed for a total of 165 hours between June 20 and August 3, 1942. Nests 17 and 21 were observed for 30 hours between June 27 and July 15, 1944. Platform blinds were placed level with, and 3 to 5 feet from, these nests. Song perches and territorial boundaries of 14 pairs with nests were plotted in the field during 40 hours of observation between June 24 and August 3, 1946. Morning song was studied on ten trips, each of which began about an hour and a half before sunrise and ended when rhythmic singing ended. Throughout my study the time recorded was Standard Time. Observations outside of the blinds were made with an 8x binocular and a 32x telescope.

The females of Nests 2, 4, and 21 were marked with aluminum bands colored with nail varnish, and the female of Nest 21 was made more readily identifiable by cementing a yellow feather to her upper tail coverts. Each of these four birds was captured in a quarter-inch mesh wire trap built around the nest. The hinged, propped-up top of the trap was released by a string from the blind as soon as the bird settled on the nest. The sex of unmarked birds could sometimes be recognized through their call notes and songs. A few individuals could be recognized as such by special mannerisms or details of coloration.

Habitat and Population

The study area was largely second-growth woodland. Large-toothed aspens (*Populus grandidentata*) and quaking aspens (*P. tremuloides*) dominated, but there was a scattering of birch (*Betula papyrifera*), maple (*Acer rubrum*), and

[1] This paper is a contribution from the University of Michigan Biological Station. The author wishes to thank Dr. Olin Sewall Pettingill, Jr. for his guidance and criticisms, and Mrs. Margaret Morse Nice for her many helpful suggestions.



Distribution in 1942, 1944 and 1946 of Least Flycatcher nest-territories and nest-sites at the University of Michigan Biological Station. Note that in 1944 and 1946 certain singing males were not on territories.

pine (*Pinus resinosa*). The crowns of the large-toothed aspens formed a canopy 30 to 40 feet high. A lower leaf-stratum was composed of the tops of birch, maple, and quaking aspen saplings. The ground cover was primarily bracken (*Pteris aquilina*), under which a few shade-tolerant plants grew. Fire had destroyed the original forest in 1901.

The 7-acre area had a population density of 2.7 and 2.0 pairs of Least Flycatchers per acre, respectively, in 1942 and 1944. The birds seemed to like the constant human activity and the artificially open woods; farther away, where the aspen woodland was unbroken, they were much less common. The 14-acre area had a population density of 0.7 pairs per acre in 1946.

Censuses of bird populations respectively in aspen, beech-maple, and pine communities in Cheboygan County have revealed that the Least Flycatcher inhabits only the aspen and beech-maple associations. Prescott (1946) found

TABLE 1

POPULATION DENSITY IN LEAST FLYCATCHER BREEDING HABITATS

Authority	Habitat Type	Years	Number of Acres	Total Pairs Counted	Average Per 100 Acres
Saunders	Orchard and shade trees	1930–31	50	6	12
Saunders	Aspen-cherry forest, undisturbed	1930–31	1166	43	3.7
Saunders	Aspen-cherry forest, cleared for camping	1930–31	123	4	3.3
Saunders	Aspen-maple thicket	1930–31	333	7	2.1
Hofslund	Beech-maple forest	1946	160	9	5.6
This paper	Open aspen woods	1942	7	19	271
This paper	Open aspen woods	1944	7	14	200
This paper	Open aspen (7 acres) plus closed aspen (14 acres)	1946	21	11	52

one Least Flycatcher in a pine community. It was singing along the border of a small island of aspens within the pine forest. Saunders (1936) encountered the Least Flycatcher in 4 out of 19 habitats that he censused in Allegany State Park, New York. An analytical summary of Least Flycatcher population data is given in Table 1.

Whereas neither Saunders nor Hofslund (1946) found as great a density of population as I did, their figures do demonstrate the Least Flycatcher's preference for open woods. Saunders found the greatest density in orchards and among shade trees—decidedly the most open of the habitats—and the smallest population in the aspen and red maple thicket—the least open habitat. Hofslund found that the species did not invade the forest interior but kept to the edges of the paths and roads crossing his study plot. We are forced to conclude, therefore, that open areas in the woods are a primary habitat requirement, and that trees of many sorts are suitable so long as there are openings among them. Forbush (1927:361) states that the species has "become accustomed to man

and his works and prefers his neighborhood to more retired localities." Nearness to human habitations can hardly be considered a habitat requirement, however; the important feature of the human neighborhood is probably the man-made openings in the woods.

This preference for edge was clearly shown by the sites of the 44 nests I studied: 20 were on the edges of clearings or along roadsides; 18 were less than 10 feet from such an edge; and 6 were slightly more than 20 feet from the edge. The preference seems to be based on two requirements: shade for the nest, and an open area for feeding and for song posts.

I found that the larger open areas surrounding the woods (e.g., the saw mill clearing and the dump area) were used as neutral feeding grounds by all the Least Flycatchers which nested nearby. The availability of such an extensive neutral feeding ground may decrease intraspecific conflict and the size of individual territories, hence increase population density.

All territories included, or were bordered on at least one side by, an opening in the woods. The song posts used early in the morning were on these edges, and although the male moved about the territory during the singing period, most of the singing itself was done from the edge.

Interspecific Habitat Relationships

So segregated in their several niches were the various bird species of the area that I observed little evidence of interspecific competition. At Nest 21, a Chipping Sparrow (*Spizella passerina*) built its nest in the same maple tree, yet the two species lived together quite amicably. Four flycatchers—the Phoebe (*Sayornis phoebe*), Kingbird (*Tyrannus tyrannus*), Wood Pewee (*Contopus virens*) and Crested Flycatcher (*Myiarchus crinitus*)—nested and fed in areas immediately adjoining Least Flycatcher territories and sometimes briefly invaded them, but I observed no conflict. Williams (1936:382) commented on the interspecific ecological segregation of the breeding Acadian Flycatchers (*Empidonax virescens*), Wood Pewees, and Crested Flycatchers of a beech-maple climax community. "So far as food habits are concerned the flycatchers form a group by themselves, each species having its own hunting ground."

At first glance the Redstart (*Setophaga ruticilla*) and Least Flycatcher appear to occupy precisely the same habitat niche. The nest of the one resembles that of the other in site and structure. Yet Hofslund (1946) reported the nesting of the two species side by side without conflict in a beech-maple forest near Douglas Lake. He found, however, that the more abundant Redstart (38 pairs per 100 acres) nested throughout the woods, whereas the Least Flycatcher (6 pairs per 100 acres) nested only along paths and roads. Within my study area no Redstarts nested. The species seemed to prefer the dense, continuous maple forest farther away from the Biological Station.

I observed only one instance of interspecific conflict—that between a pair of nest-building Cedar Waxwings (*Bombycilla cedrorum*) and a pair of Least

Flycatchers whose nest contained eggs. The encounter took place on July 27, 1944. The flycatchers' nest was outside my study area, but on the Station grounds. I watched developments for 35 minutes, during which period the waxwings made three visits to the nest, stealing material each time. When they appeared in the vicinity both the male flycatcher, perching 50 feet from the nest, and the female, sitting on the nest, called rapidly; but not until the robbers began to tear at the nest did the male actually attack. He darted at their heads with bill snapping, hovered over them, and fluttered about them calling excitedly. The female *remained on the nest*, pecking at the waxwings and calling too, but she did not leave even though the whole structure rocked beneath her. The waxwings evinced little concern over the noise and attacks. Finally, on their third visit, the female flycatcher left the next when it began to tip over. Both flycatchers now flew at the waxwings, causing them to retreat momentarily. The end came when one of the waxwings pulled so much of the nest away that the three eggs and torn remains fell to the ground. Both flycatchers made a final assault, but when the waxwings flew off they carried pieces of the nest in their beaks.

What impressed me most about this fight was the failure of the male flycatcher to attack the waxwings when they first appeared in the vicinity of the nest. I was impressed, too, with the refusal of the female to leave her nest until the very last. Davis (1941:160) has said of the Kingbird that "the important characteristic of this interspecific fighting is that only the male fights." I have never witnessed an encounter between Least Flycatchers and a nest-robbing Blue Jay (*Cyanocitta cristata*), but I suspect that in cases of that sort, involving a considerably larger bird species or predatory mammal, both the male and female would instantly attack. Certainly, as I have many times observed, when a human being interferes at the nest both the male and female attack with swoops and bill-snapping and the attack does not cease until the human being has withdrawn.

Territory

Within its chosen habitat, the Least Flycatcher selects and defends a territory in which it spends much of its time, builds its nest, and gathers some food for itself and young. Beyond the borders of this territory it may use a neutral feeding ground, where individuals of both sexes feed without conflict.

The breeding cycle of the Least Flycatcher covers about 50 days. Nest-building requires about 5 days, egg-laying 3 to 6 days, incubation 15–16 days, fledging 14 days, and feeding of full-fledged young about 10 days. The earliest date on which I actually saw an active nest was June 19 (the nest held two young about three days old on that date). This nest must have been built in the last part of May. The latest date on which I found a nest under construction was June 24. The first nest of this pair had been destroyed. The female builds the nest, incubates the eggs, and broods the nestlings. Both sexes feed the young.

The male remains within the nesting area throughout nest-building, egg-laying, and incubation except when he visits a neutral feeding area. Occasionally he feeds the female while she is on the nest. I noted the following behavior at Nest 4 on the ninth day of incubation: "A few hours after I banded the incubating bird the male came to the nest to feed the female, giving his usual guttural *speetz*. This time instead of remaining on the nest the female flew off, flying wildly about the territory with the male in chase. After a few seconds of flight the female landed on a branch ten feet from the nest where the male fed her, after which she flew back to the nest. The male remained on the branch singing for about a minute."

Each nesting pair is dominant over other Least Flycatchers in its own territory, and intrusion of a neighboring individual or pair always incites immediate reaction of defense. The boundaries of territories seem to change somewhat from time to time, but even when a nest is destroyed and a new one built the general location of the territory does not change much. The largest territory I measured occupied 0.50 acres (21,881.5 square feet), the smallest 0.03 acres (1431.5 square feet). The average of 33 territories was 0.18 acres (8036.8 square feet). The average distance between nests was about 175 feet, the greatest 215 feet, and the least 60 feet. Territories are maintained by pursuit, threat-posture, fighting, and song.

Pursuit. When a Least Flycatcher appears in a Least Flycatcher territory not its own it is immediately recognized as an intruder by the resident male. The owner of the territory utters a sharp note and gives chase, both birds flying excitedly and swiftly about. If the intruder does not fly out of the territory, a fight ensues. The resident male forces the intruder to the ground, where the two posture (see below) and then engage in a tumbling struggle which ends in the retreat of the defeated bird (apparently always the intruder). After following the intruder a few feet beyond the territory, the resident male returns to a favorite perch and calls *che-bec*.

The male is usually the first to fly to the defense of the territory. The female's defense is different from the male's in some ways. First, she does not defend the entire territory but is primarily concerned with an area 20 feet in radius around the nest. She does not attack or pursue the intruder until it has come well within this restricted area; then, if her mate does not appear, she flies from the nest in pursuit. Usually when she thus leaves the nest only a pursuit flight occurs, for this is sufficient to force the trespasser out. If two birds enter the territory at the same time, the female sometimes assists the male in defense; in these cases, however, the male always is first to fly toward the enemy, the female following a few seconds later. This behavior I observed on six occasions.

Davis (1941:158) described this type of behavior in the Kingbird. "The pair which has already acquired the territory defends the area in violent fights. A most important point is that both sexes cooperate to drive out the intruder. The female fights as vigorously as the male."

Threat-posture. Threat-display involves enlarging of apparent body size by fluffing out the breast feathers; raising the crest; extending, vibrating, and bending the wings; spreading and flicking the tail up and down; and crouching. Upon recognition of an intruder in the territory the resident male flicks his tail, raises his crest, crouches momentarily, and leaves his perch in pursuit. This requires only a second or two. Following the chase both birds may drop to the ground, crouch, and face each other with outstretched, vibrating wings. When the resident male has driven the other off, he returns to a favorite perch and sings *che-bec*. Each time he sings he flicks his tail and raises his crest.

The female threat-postures only occasionally. When, in defense of territory she meets an opponent, she spreads her tail, raises her crest, and fluffs out her breast feathers. She threat-postures only briefly and does so principally in opposing man, small mammals and such birds as are actually attacking the nest.

Davis (*loc. cit.*), writing of the Kingbird, described a display which he believed "served the same ends as the territory song in many passerine birds." He stated: "The fighting consists of air battles, conducted with great chattering and display. A note *b-zee* is used in addition to the *tik* note. A great tumbling display occurs when the intruder is some distance away. . . . The bird flies high in the air chattering with wings quivering and then, after tumbling, climbs high again and repeats the tumble several times." I have seen much aerial chasing among Least Flycatchers but never a display comparable to this.

Fighting. Fighting is closely related to pursuit. Often during a chase the two birds fly at each other just before dropping to the ground. Fighting can be so swift that only a flashing of feathers and whirling of two bodies is visible to the human eye. Fighting usually follows what appear to be attempts to intimidate through posturing. Only once have I seen what I was sure was a female Least Flycatcher fighting (see discussion above of the Cedar Waxwings).

Song. Song is important in establishment and maintenance of territory. Ornithologists are in wide agreement that the song of the male sounds very much like *che-bec* (Bent, 1942:221). This *che-bec* varies little within itself as a phrase. It is repeated rapidly during part of the morning song period; in daytime singing it is repeated less regularly and not very rapidly; and in flight it is sometimes mixed with certain unmusical notes. According to my observations the male rarely sings in the nest-tree.

The morning song is given daily by the male within the confines of the territory, usually a few feet above the level of, but not very near, the nest. It is a continual and more or less rhythmical repetition of *che-bec*. It is given from several song-perches in trees along the edges of the territory. Where several nests are close together (as were Nests 34, 38 and 44) most of the singing is done along the borders of the territories. All of the males of such an area seem to sing with the same tempo and intensity, as if performing in unison. They jerk their

heads and flick their tails with each repetition of a song phrase. The females remain quietly on their nests during these joint performances.

About the time the female begins incubation the male's morning song is given from before dawn until about sunrise. It decreases in duration as the nesting cycle progresses. Nine of the ten mornings on which I paid special attention to morning song were clear. On July 18 the sky was overcast, but I could not see that this grayness of day affected the singing of the males in any way. On June 29 the very first *che-becs* sounded about 15 minutes before rhythmical singing started. At 3 o'clock (19 minutes before civil twilight), 15 males began rhythmical singing. They sang for 70 minutes, ending 14 minutes after sunrise. Morning song usually begins rather slowly in the semidarkness, increases in tempo as the sky brightens, and becomes slower again about sunrise. When sung most rapidly (as it was 30 minutes before sunrise on June 29 and July 4, in 1946), the *che-bec* is repeated about 60 times a minute. This fervent morning singing does not continue all summer. By July 15, the song

TABLE 2

DATA ON LEAST FLYCATCHER MORNING TWILIGHT SONG IN 1946

Bird	Date	Morning		First Call note		Rhythmic Song				
		Civil Twilight Began	Sunrise	Hour	Minutes before Sunrise	Hour began	Minutes before Sunrise	Hour Ended	Duration	Number of Males Singing
Least Flycatcher	June 29	3:19	3:56	2:45	71	3:00	56	4:10	70	15
	July 4	3:23	3:59	2:50	69	3:07	52	4:05	58	14
	July 12	3:28	4:05	3:10	55	3:20	45	3:50	30	10
	July 15	3:30	4:07	3:25	42	3:30	37	4:05	35	11
	July 18	3:32	4:10	3:30	40	3:40	30	4:05	25	10
	July 22	3:36	4:14	3:30	44	3:45	29	4:02	17	4
	July 25	3:39	4:17	3:35	42	3:45	32	4:04	19	4
	July 28	3:42	4:20	3:43	37	3:45	35	4:00	15	2
	Aug. 2	3:47	4:26	3:55	31	—	—	—	—	1
Kingbird	June 29		3:56			2:20	96			
	July 4		3:59			2:30	89	3:05	35	
	July 18		4:10			3:10	60	3:40	30	
	July 22		4:14			3:12	62	3:50	38	
	July 28		4:20			3:15	65	3:55	40	
Wood Pewee	July 12		4:05	3:14	51	3:18	47			
	July 18		4:10	3:16	54	3:25	45	3:45	20	
	July 25		4:17			3:40	37			

Sunrise and the beginning of morning civil twilight, recorded here in Standard Time, were determined for 85° W. longitude and 45° N. latitude from "Tables of Sunrise, Sunset, and Twilight", Supplement to the American Ephemeris, 1946. Morning civil twilight begins when the sun is 6° below the horizon and ends at sunrise. To convert Standard Time to Eastern Standard Time, add one hour.

began at civil twilight, lasted 35 minutes, and ended 2 minutes before sunrise. By the time the young were ready to leave the nest (July 22) it lasted only 17 minutes, stopping 12 minutes before sunrise. When the young scattered from the territory it stopped altogether (see Table 2).

The cessation of morning song in late summer is a gradual process, since the pairs are at various stages in the nesting cycle. Individuals which were late in nesting in 1942 did not sing much during my period of observation. Their song period was shorter than that of males at the same stage of the nesting cycle earlier in the season when all the birds of the area were singing. Many males singing in adjoining territories seem to stimulate one another. The quality and quantity of singing, then, do not depend entirely upon the stage the individual males have reached in the nesting cycle, but also upon the number of singing males in adjoining territories. The greater the number of males the greater the need for song—i.e., for defense of territory through song. When the young scatter, singing stops. In this respect the Least Flycatcher seems to differ from the Wood Pewee. Craig (1943:153) states that "daytime singing continues long after the end of the breeding season."

Mention of the Wood Pewee leads to a consideration of the ways in which the morning song of the Least Flycatcher resembles, and differs from, that of certain other flycatchers of the Douglas Lake region. The Wood Pewee's morning song certainly is much more complex, and also more musical. It is notable for its rhythmic quality. The Phoebe has an early morning song, but I know little about it. On June 25, 1946 I heard a Phoebe start singing about an hour and a half before sunrise. It stopped at sunrise. The Kingbird begins its song even earlier than the Least Flycatcher and Wood Pewee do (on June 29, 1946, more than an hour and a half before sunrise) and usually continues 30 to 40 minutes. The song is rhythmical and the basic phrase has several syllables. It decreases in duration and intensity as the season advances (see Table 2). The Crested Flycatcher has a twilight song (Nice, 1928:255) but I did not hear it, possibly because of the lateness of the season.

Daytime Song. Daytime song is never, apparently, the routine performance that morning song is. It may be given at any time during the day. Like morning song, it is a repetition of the phrase *che-bec*. Day time singing which I heard in 1946 lasted three to five minutes after interspecific territorial disputes, and the *che-bec* phrases were uttered about 50 times per minute during these periods. Daytime song accompanies the male's approach to the female (whether she is on the nest or not); it serves as a protest to invasion of the territory by a human being; and it may serve as territory advertisement whether or not there is threat of interspecific or intraspecific dispute.

Flight Song. The flight song has been variously described. Forbush (1927: 360) says that it consists of "a jumble of notes uttered in a kind of ecstacy" while the male "flutters about in a circle." Hoffman (1904:202) says that just before dusk the male, after flying up from a tree near the nest, sings a song in

which "the call-note, *whit*, and the ordinary song, *se-bic'*, are repeated many times." Chapman's (1932:372) description of "crescendo passages" in which the male "literally rises to the occasion, and on trembling wings sings an absurd *chebêc, tooralooral, chebêc, tooral-ooral*" is puzzling. One hardly knows whether this is a flight song or not. I certainly have never heard such a song, though on two occasions during the early part of the incubation period a male on approaching the nest gave a series of flight-notes and *che-bec* phrases run together; and on another occasion, when adult flycatchers were defending one of their young against a Chipmunk (*Tamias striatus*), they gave a jumbled mixture of notes none of which sounded quite familiar. A well defined flight song which I witnessed at 7:30 p.m. on July 3, 1946, was performed 75 feet overhead. Hearing continuous *che-bec* song above me, I looked up, searched the sky, and saw a Least Flycatcher making short dips in its flight over the forest. Suddenly both song and flight ended as the bird closed its wings and dived straight down to the woods. While this song lasted, no other Least Flycatcher in the area was singing.

Evening Song. The above-described flight song is the only well defined song I have ever heard a Least Flycatcher sing in the evening. The male sings no evening twilight song in any way comparable to the morning song, though of course he may utter an occasional *che-bec* as he does otherwise during the day. The Wood Pewee often sings a twilight song in the evening.

Call notes of the female. The female does little, if any, true singing. She moves about the nest quietly. Occasionally she calls *whit* while feeding or as the male approaches and leaves the nest. She sometimes gives an extended series of *chweep*-notes. If this *chweep* is a song-note at all comparable to the male's *che-bec*, it differs in that it is softer and wholly unaccented at the end. I found that I could distinguish the female from the male on the basis of this note. Both the male and female called *whit*, of course, but only the male called *che-bec*, and only the female called *chweep*.

The female used her *chweep*-note in defending the nest against various animals, notably man. I observed a female fly off from a nestful of young when a Thirteen-lined Ground Squirrel (*Citellus tridecemlineatus*) came to the foot of the nest-tree. She attacked furiously, the outburst of *chweep*-notes lasting until the rodent departed. She gave a series of *chweep*-notes in the nest-tree before she returned to the nest and settled down to brooding. The male was nowhere to be seen, and did not return for some time.

Summary

In the vicinity of Douglas Lake, Michigan, the Least Flycatcher's principal nesting habitat is more or less open second-growth aspen associes. Of 44 nests studied in 1942, 1944, and 1946, 20 were along the very edges of clearings, 18 were less than ten feet from the edges, and 6 were slightly more than 20 feet back from the edges. The population density of favored habitat (i.e., aspen

woods intersected by roads and paths) was 200 to 271 pairs per 100 acres; that of unbroken aspen woods, not far away, 70 pairs per 100 acres.

The territories of the 44 pairs studied were of two sorts: (1) that in which a pair mated, nested *and fed* throughout the whole reproductive cycle, and (2) that in which a pair mated and nested, but fed in a neutral or communal feeding area adjoining. These neutral feeding areas were not defended. Nest territories varied in size from .5 acres to .03 acres (average of 33 measured territories: .18 acres). Territories were defended principally by the males, their singing being an important means of advertisement, defense and maintenance. The male's morning song began before dawn and ended about sunrise. It was a continual repetition of the phrase *che-bec*. When most fervent (just before sunrise early in the incubation period) it was repeated about 60 times per minute. Daytime song was desultory and sometimes followed territorial dispute. A flight song, performed in the evening 75 feet above the ground, was a rapid repetition of *che-bec* phrases. I heard no twilight evening song at all comparable to the twilight morning song. Throughout that part of the reproductive cycle which I observed (egg-laying to the scattering of the young), males devoted a definite part of each morning to singing.

During three visits of a pair of Cedar Waxwings which destroyed a Least Flycatcher nest in stealing material from it, the male flycatcher did not attack until the waxwings were at the nest, and the female flycatcher remained in the nest (which she defended to some extent by pecking) until the final visit, when the nest was pulled completely loose from its moorings. She then joined the male in aerial, but futile, attack.

There seemed to be no friction between Least Flycatchers and such Wood Pewees, Crested Flycatchers, Phoebes and Kingbirds as nested in the vicinity.

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48 NEW JERSEY AVENUE, BERGENFIELD, NEW JERSEY

NEW LIFE MEMBER

Aaron Moore Bagg was born at Holyoke, Massachusetts on April 6, 1912, son of Aaron Clark Bagg and Helen Moore Bagg. As a child he was privileged to have the Duck Hawks of Mt. Tom as avian neighbors, and to gaze upon that priceless possession of the household—a watercolor portrait of a Duck Hawk by Louis Agassiz Fuertes. He attended Hotchkiss School and in 1934 obtained his bachelor's degree from Princeton. A newspaper writer by profession, he is an enthusiastic amateur ornithologist, being an Associate of the American Ornithologists' Union and a member of the Massachusetts and New Hampshire Audubon Societies. He is especially interested in hawk flights and has published thought-provoking papers concerning the correlation between barometric pressure-patterns and spring bird migrations. With Henry M. Parker he has been making a special study of the northward spread of the Turkey Vulture into New England. He became a member of the Wilson Ornithological Club in 1948. He is now serving as a trustee of the organization.

NEW BIRDS FOR THE STATE OF KANSAS

BY RICHARD AND JEAN GRABER

W. S. LONG, in his useful "Check-List of Kansas Birds" (1940:433), clearly pointed out the need for further field work in the western part of the State. Because of this, and also because George M. Sutton and his colleagues had recently found so much of ornithological interest in western Oklahoma, we visited the southwestern corner of Kansas for three and a half months (February 13 to May 27) in 1950, finding that the western-southwestern element in the avifauna was much more pronounced than had heretofore been realized. We collected at several localities in Meade, Morton, and Hamilton Counties. This region was semi-arid and flat for the most part. The lesser tributaries to the larger streams were completely dry most of the time. These lesser tributaries were called 'canyons', locally. Their banks were often precipitous, sometimes 50 feet high. The principal trees of the region were cottonwoods (*Populus* sp.) and these grew only along the streams.

Most of the specimens mentioned in this paper were collected in Morton County along the Cimarron River 8 miles south of Richfield. Here the river bed was about a quarter of a mile wide and completely dry. On either bank was an extensive stand of large, scattered cottonwoods, bordered by thickets of small cottonwoods, willows (*Salix* sp.) and *Tamarix*. Thickets of skunk-bush (*Schmaltzia trilobata* of Britton and Brown, 1913:483) grew on the north bank above these woods. Near the east end of the woods was a small cattail marsh, and along the periphery were several small water holes. We were in Morton County February 21–March 12, March 21–24, April 22–May 15, and May 19–27; in Hamilton County March 13–20, April 10–21, and May 16–18; and in Meade County the rest of the time.

During the course of our study we collected 12 birds not heretofore taken in Kansas, as well as one species believed to have been extirpated some time ago. This paper summarizes our data pertaining to the 13 above-mentioned forms. We identified our specimens at the University of Michigan Museum of Zoology, using the excellent comparative material in the Peet and Sutton collections as well as in the Museum collection itself.

We wish to acknowledge the fine cooperation of the State Forest, Fish and Game Commission, whose representatives, Director Dave Leahy, Superintendent Harry Smith of the Meade State Game Farm, and District Game Protector Ed Gebhard of Meade County, did all they could to help us. George Attwood, of the U. S. Soil Conservation Station in Morton County kindly gave us permission to collect on Station lands. Walter Posey of Elkhart helped in many ways to make our trip profitable. Especially do we wish to thank Dr. C. W. Hibbard for helping us in many ways, and Robert M. Mengel for identifying our *Empidonax* specimens.

Dendrocopos scalaris. Ladder-backed Woodpecker.

This species is fairly common in Morton County among cottonwoods 8 miles south of Richfield. We first encountered it February 26, when we saw a pair near the old Wilburton bridge and succeeded in securing the female. Between this date and May 20 we noted the species 9 times (collecting two females and a male on March 9 and a male on March 22) in a seven-mile stretch of the Cimarron between Wilburton and Elkhart bridges. On May 9 an excited female which probably had a nest allowed us to approach closely and refused to leave a certain part of the woods.

Though our five specimens are all from Morton County, this woodpecker probably ranges considerably farther north and east in the State. It has been reported in Colorado as far north as Pueblo County (Cooke, 1898:162), and in Oklahoma as far east as Ellis, Kiowa, and Tillman Counties (Nice, 1931:115; Sutton, 1936:432). We have compared our specimens with topotypical *cactophilus* and almost topotypical *symplectus* in the Sutton collection and decided, largely on the basis of the lightness of the under parts and breadth of the white bars on the back, that they are closer to *symplectus*. We are, of course, aware of Todd's expressed belief (1946:312–313) that *symplectus* is a synonym of *cactophilus*, but *symplectus* appears to us to be a whiter race.

Tyrannus vociferans. Cassin's Kingbird.

On May 14 near the south bank of the Cimarron River, 10 miles south of Richfield, we came upon a lone kingbird perched in a dead shrub in a large weedy pasture. We identified it as this species, but failed to secure it. On May 19, we saw two more Cassin's Kingbirds sitting on the sand in the middle of the dry bed of the Cimarron. They did not leave this open area, but were wary and stayed out of gun-range. On May 26, we encountered two pairs on the weedy slopes of low hills overlooking the north bank of the Cimarron near the Elkhart bridge, and succeeded in collecting a male (testes much enlarged).

Myiarchus cinerascens. Ash-throated Flycatcher.

Noted only among large cottonwoods along the Cimarron in Morton County, south of Richfield. Here we saw and heard one bird May 5, collected a female (ovary somewhat enlarged) May 7, and encountered one bird or a pair on each of four occasions May 8–23. The species seemed to prefer partial clearings in which there was some dead or fallen timber.

Empidonax wrightii. Wright's Flycatcher.

Of the 13 flycatchers of the genus *Empidonax* which we collected among the cottonwoods and willows 8 miles south of Richfield, seven proved to be *traillii*, three *minimus*, and three *wrightii*. The *wrightii* we took on May 8 (male and female) and 12 (male). In none of these were the gonads noticeably enlarged.

Corvus cryptoleucus. White-necked Raven.

Though alleged to have been extirpated many years ago (see Long, 1940:448; Goodrich, 1945:247; and A.O.U. Check-List, 1931, p. 226), this corvid is probably a fairly common summer resident today on the high plains of western Kansas. Game Protector Gebhard told us he had seen the species regularly in summer at least since 1941, in which year he had found it nesting on old windmill towers on the high plains of Hamilton and Kearney Counties. C. O. Shetterly of Syracuse told us he had been seeing the birds in summer (not in winter) since 1931. We first encountered the species (a pair) 13 miles north of Syracuse, Hamilton County. We saw the two birds clearly and heard them calling. When we returned to this area on April 18 we saw at least 19 birds, and collected one (a male with enlarged testes). One of two old nests we had observed earlier was being relined.

Our friend Robert M. Mengel, who travelled through Kansas this past summer, informs us that on August 21 he saw a flock of about 100 White-necked Ravens near the place at which we collected our specimen.

Vireo solitarius plumbeus. Plumbeous Solitary Vireo.

Vireo s. solitarius has long been known to migrate through Kansas, but of the 5 specimens of Solitary Vireo taken by us in Morton County, 8 miles south of Richfield, not one was *solitarius*. Four were *plumbeus* and one was *cassini*. The *plumbeus* we took May 8 (male and female), May 9 (singing male), and May 10 (female). In all of these the gonads were somewhat enlarged, but we did not find a nest.

Vireo solitarius cassini. Cassin's Solitary Vireo.

A female (ovary slightly enlarged) Solitary Vireo which we collected 8 miles south of Richfield clearly belongs to this dull colored western race.

Vermivora virginiae. Virginia's Warbler.

We encountered this species only in Morton County, in low cottonwoods 8 miles south of Richfield. We noted it May 4–10, always in mixed flocks of migrating warblers. We saw one on May 4, one (male collected) on May 6, two on May 8 (one collected, a male), and one on May 10.

Dendroica nigrescens. Black-throated Gray Warbler.

We found this warbler quite common between May 8 and 13, during which period we collected three females and a male. We encountered the species mainly in thickets of young cottonwoods and other scrubby trees along the Cimarron in Morton County.

Dendroica townsendi. Townsend's Warbler.

Noted on May 3, 11, and 20, on each date a single bird in woods along the Cimarron, 8 miles south of Richfield. Our only specimen, a female collected May 3, was with a company of Orange-crowned Warblers (*Vermivora celata*).

Piranga ludoviciana. Western Tanager.

This bird we saw many times May 2 to 26 (the end of our stay) and came to regard it as a fairly common transient. On May 6, 8 miles south of Richfield, we collected two males from a mixed flock of Bullock's Orioles (*Icterus bullockii*) and Western Tanagers. So far as we have been able to ascertain, *Piranga ludoviciana* has not actually been collected in Kansas heretofore, though Long (1940:453) called the species a rare summer resident in the west and stated that there were two published records for the State.

Chlorura chlorura. Green-tailed Towhee.

We first encountered this species on April 25, when we collected a beautiful male (testes somewhat enlarged) in a canyon opening into the north bank of the Cimarron River in Morton County, about 9 miles north and 3 west of Elkhart. The floors and walls of the canyons in this region were upgrown with *Schmaltzia*, and it was in a dense growth of this shrub that we found the bird. It was associating with Spotted Towhees (*Pipilo maculatus*). The following day we collected another male in the same canyon. We saw three other birds (the last on May 23), in thickets at the edge of extensive woodlands farther east along the Cimarron.

Aimophila ruficeps. Rufous-crowned Sparrow.

On May 21 we saw a Rufous-crowned Sparrow near Point Rock in Morton County, about 9 miles north and 2 miles west of Elkhart. The bird was on the floor of a wide draw, along the sides of which grew sparse clumps of *Schmaltzia*. The bird sought cover in this shrubbery, and we did not see it again.

Spizella breweri breweri. Brewer's Sparrow.

Brewer's Sparrow apparently is a common spring migrant in southwestern Kansas. We noted it throughout Morton County, encountering it first on April 8, when we collected a male (testes very small) in a dense clump of *Schmaltzia* along a rocky ledge above the Cimarron River. We recorded it on five dates thereafter, collecting three more specimens, all males with considerably enlarged testes, the last on May 1. The species inhabited canyons, sage pastures

and the edges of woods but never strayed far from dense, shrubby cover. Twice we saw it along roadside fences.

On the basis of size our specimens are referable to the nominate race, though two of them (R.R.G. 425 and 465) are rather dark on the dorsum for that form. These two measure, respectively: wing 64, 63 mm.; tail, 60, 60. The other two (R.R.G. 360 and 435) measure: wing, 64, 62; tail, 60, 58.

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NEW LIFE MEMBER

Theodora Gardner Melone, a graduate of Vassar and of the Division of Library Instruction at the University of Minnesota, is now librarian of the Geology Library at the last-named institution. She is a member of the National Audubon Society, the Isaac Walton League, and the Minnesota Ornithologists' Union. Formerly on the Board of Directors of the Geological Society of Minnesota, she has served that organization also as chairman of its field-trips committee. She has been vice-president and program committee chairman for the Minnesota Bird Club. Joining the Wilson Club in 1947, Miss Melone promptly distinguished herself through her work as a member of our Committee on Aid to European Orinthologists. She is especially interested in bird behavior and life history studies. She has made several trips to northern Minnesota and to neighboring states, studying birds. She is enthusiastic over walking, bicycling and canoeing.

GENERAL NOTES

Ring-billed Gull chases Great Blue Heron.—On March 6, 1950, Mr. and Mrs. L. C. Fievet, Tom Atkeson, William Jernigan and I were observing birds along the sloughs of the Wheeler National Wildlife Refuge about five miles up the Tennessee River from Decatur, Alabama. A Great Blue Heron, *Ardea herodias*, which rose ahead of us, elected to cross the river but was immediately beset by a lone adult Ring-billed Gull, *Larus delawarensis*, which had been flying and resting along the main channel. The gull centered its attack on the heron's back, apparently attempting to pull loose some upper tail coverts. The pursuit lasted about 45 seconds, during which time the heron flew forward perhaps 200 yards. When the heron veered, turning back for the bank, the gull discontinued its harassing and resumed its search for food in the main channel.

Though both fish-eaters, the Great Blue Heron and Ring-billed Gull obtain their food in quite different ways so they can hardly be considered competitors. I am, therefore, at a loss to explain the gull's antagonism to the heron in the case just reported.—Thomas A. Imhof, *307 38th St., Fairfield, Alabama.*

Bald Eagles attack crippled gull.—About 8 o'clock on the morning of January 17, 1943, Louis Brown and I were on the north levee of the Chautauqua National Wildlife Refuge near Havana, Mason County, Illinois. While opening a gate into the Refuge we noticed an unusually large number of Bald Eagles (*Haliaeetus leucocephalus*) flying over the lake and perching in trees along the shore.

Though we did not have binoculars, we soon discovered what appeared to be a center of the eagles' interest—a rather large gull about 75 yards out in the lake and possibly 100 yards from where we were standing. It was dodging the slow, awkward swoop of a low-flying eagle. Immediately after the attack the gull resumed a normal sitting position in the water. Presently several eagles, in rough formation, swooped one after another at the gull, which obviously was too badly injured to fly, though we could not tell just what was wrong with it. It dodged all these attacks, sometimes by diving. When the immediate danger was over and the air about it had cleared, it resumed a resting position. It seemed to be about the right size and color for a Herring Gull (*Larus argentatus*).

The attacks were not yet over. A total of 12 eagles, including several adults with white heads and tails, circled over the lake at the same time. One after another the great birds swooped down on the gull. The harried bird managed to elude each attack, although two or three times escape was narrow. At least two eagles touched the water with their claws or toes, and another actually settled momentarily, rising ponderously from the surface and flapping away. The whole performance called to mind a squadron of bombers peeling off in sequence in their determination to reach an objective.

After the mass attack the eagles separated somewhat, though some of them continued to swoop at the gull, which by this time was much farther out from shore. Eventually it disappeared from our sight around a promontory. We do not know what happened to it.

The inability of the eagles to capture the gull seemed to us good evidence that they could not be considered very important from the standpoint of primary predation. We were much impressed by the ability of the clumsy, crippled gull to elude their attacks.—Lee E. Yeager, *Colorado Cooperative Wildlife Research Unit, Colorado Agricultural and Mechanical College, Fort Collins.*

A Ring-necked Pheasant × Prairie Chicken hybrid.—About 1933, near Ellendale, southeastern North Dakota, Burton Brown of Forbes, North Dakota, shot an interesting cross between a Ring-necked Pheasant (*Phasianus colchicus*) and a Prairie Chicken (*Tympanu-*

chus cupido). The bird was flushed with a group of pheasants in an area throughout which Prairie Chickens and Sharp-tailed Grouse (*Pedioecetes phasianellus*) were also fairly common. The mounted specimen came into the possession of the State Game and Fish Department. Here it was discovered by Roy N. Bach, coordinator of federal aid for North Dakota. Bach was instrumental in having it forwarded to the Fish and Wildlife Service, in Washington, D. C. It has recently been dismounted and made into a study skin.

A hybrid Ring-necked Pheasant × Prairie Chicken from North Dakota. Note especially the tail-shape, the partly feathered tarsi, and the pronounced dorsal barring. Photos by courtesy of the Smithsonian Institution.

I am indebted to Dr. John W. Aldrich of the Service for comments regarding the specimen's species characters, many of which clearly show in the accompanying Smithsonian Institution photographs. The bird (probably an immature male) resembles an adult male Ring-necked Pheasant in the following ways: 1. The bill is large, light yellowish, and shaped like that of a male Ring-neck. 2. The operculum and nostril are large and exposed. 3. The scales of the front toes are without lateral projections or 'snowshoes'. 4. The unfeathered lower half of the tarsus has a rudimentary spur. 5. There is a wattle-like bare area about the

eyes. This area is not, however, so extensive as it is in an adult male Ring-neck. 6. There are distinct black ear tufts (see photo of dorsal surface).

The bird resembles a Prairie Chicken thus: 1. The upper parts, especially the feathers of the upper back, are strongly barred. 2. The flank feathers are strongly and completely barred on at least one web. 3. The tail has a dark brown terminal area on all but the middle pair of rectrices, and the color of this area is similar to that of the Prairie Chicken's tail. 4. The markings of the primary coverts (which do not show in either photograph) are very much like those of the Prairie Chicken. 5. The tarsi are feathered, in front, half way down to the toes.

The bare space on each side of the neck is somewhat larger than in a typical male Ring-neck, but the skin does not seem to have the slightly thickened quality characteristic of the booming sac of the Prairie Chicken. The reddish brown feathers of the underparts are tipped with black more or less as in the adult male Ring-neck, but they lack the brilliant metallic lustre. The tail is moderately graduated (wedge-shaped) but not nearly so long and pointed as that of a Ring-neck. The rectrices are neither square-tipped, as they are in the Prairie Chicken, nor extremely pointed, as they are in the Ring-neck. They are intermediate. The primaries are marked with white on their inner webs as are those of a pheasant, but the markings of the outer webs suggest those of the Prairie Chicken. The dark centers of the feathers of the lower back and rump have a suggestion of metallic sheen, but all these feathers are strongly barred.

The wing, bill, and toe measurements are about those of an average adult male Ring-neck, but the tail and tarsus are much shorter. The measurements, in millimeters, are: wing, 237; tail, 167; culmen from cere, 21; tarsus, 64; unfeathered portion of tarsus, 26; middle toe without claw, 46.

Natural or 'wild' hybrids among galliform birds have been recorded many times. Among the best known are those between the Capercailzie (*Tetrao urogallus*) and the Black Grouse (*Lyrurus tetrix*) (see Handb. Brit. Birds, 5: 210). Anthony (1899. *Auk*, 16: 180) has reported a cross between the Dusky Grouse (*Dendragapus obscurus*) and Ring-necked Pheasant taken near Portland, Oregon. I have reported a cross between *Pedioecetes phasianellus* and *Tympanuchus cupido* (1918. *Wilson Bulletin*, 30: 1–2, plate). Taverner (1932. Annual Report, 1930, National Museum of Canada, p. 89 and plate) has reported a cross between the Willow Ptarmigan (*Lagopus lagopus*) and Spruce Grouse (*Canachites canadensis*). Dr. Aldrich has called to my attention a hybrid between *Dendragapus obscurus* and *Pedioecetes phasianellus* (in the Fish and Wildlife Service collection) taken at Osoyoos, British Columbia, September 15, 1906, by C. deB. Green.—FREDERICK C. LINCOLN, *Fish and Wildlife Service, Washington, D. C.*

Foot-freezing and arrestment of post-juvenal wing molt in the Mourning Dove.—Scattered flocks of Mourning Doves (*Zenaidura macroura*) winter throughout south- and west-central Wisconsin. These flocks often suffer considerable mortality. A flock of approximately fifty birds at Menomonie, for example, dwindled to five during the winter of 1949–1950, according to H. M. Mattison. Four of this flock, caught by Mattison and me while live-trapping Bob-white Quail (*Colinus virginianus*), had badly frozen feet. Two more, caught later in that vicinity, as well as a third bird caught by hand in a shed at Horicon when I happened to be present, were caged indoors at Madison and cared for by Fred Wagner and myself. After about six weeks, the feet healed. Almost without exception, however, the frozen distal phalanges dropped off. This loss of bones and claws did not affect locomotion and perching, so far as we could see; but had the doves been obliged to obtain their own food in the wild during the convalescent period, their ground-scratching ability probably would have been seriously impaired. Some of the non-captive birds probably died as a direct result of starvation, but the combination of undernourishment and foot-freezing must have been lethal to many of them.

Arrestment of the post-juvenal molt was apparent in all three of the birds held captive. Of the other four trapped birds only two were given a wing molt examination. In one of these the molt of the primaries was complete; in the other the molt had been arrested. This phenomenon apparently is identical with that observed in the Bob-white by Thompson and Kabat (1950. *Wilson Bulletin*, 62: 20–31). The arrestment of molt varied in the four doves. In one bird the five outer juvenal primaries had been retained, in another bird four had been retained, in another three, in another two. The condition was bilaterally symmetrical in each case. The birds also retained, respectively, the outer four, three, two, and one white-tipped juvenal primary coverts. White-tipping and other evidences of immaturity were ap-

Left: Frozen feet of a Mourning Dove captured at Horicon, Wisconsin, February 8, 1950, and photographed the following day by Frank M. Kozlik. Right: Feet of the same dove after about six weeks of confinement. Photo by Robert A. McCabe.

parent also on unmolted feathers of the alula of the first two birds (two outer white-tipped feathers in the first; one in the second). The juvenal primaries were short, ragged, and faded dull brown, lacking entirely the sheen of the pearly gray new feathers. Swank (1950. *Texas Game and Fish*, Feb., pp. 5 and 21) states that six months are required for completion of the Mourning Dove's post-juvenal molt of primaries. If birds of late-hatched broods do not molt the outer primaries before the arrival of cold weather the molt may be arrested or suspended.—DONALD R. THOMPSON, *Wisconsin Conservation Department, Madison.*

Great Horned Owl versus porcupine.—There are few published records of encounters between the Great Horned Owl (*Bubo virginianus*) and the porcupine (*Erethizon dorsatum*). The classic account is that of Eifrig (1909. *Auk*, 26: 58), quoted by Bent and by Forbush. The porcupine is not mentioned in the food habits study of this owl made by Errington, Hamerstrom and Hamerstrom (1940. *Iowa Agr. Exp. Sta. Research Bull.* 277).

On December 8, 1949, two Great Horned Owls were trapped near Ithaca, New York, and presented to the Laboratory of Ornithology at Cornell University. Judging by size they were a male and a female. The end of a porcupine quill was noted protruding from among the feathers of the right anterior portion of the neck of the female. This quill was extracted. It was 44 mm. long, and judging from the fragments of tissue adhering to the barbs, had penetrated to a depth of at least 6 mm. This depth of penetration, coupled with the fact that

owls have a heavy protective layer of feathers, showed that the quill had been driven in with some force. The size and shape of the quill suggested the probability of its having arisen from the porcupine's tail, a notorious defensive weapon. No search for additional quills was made.

Evidence that this particular owl had attacked other prey usually avoided by most predators was the strong skunk-smell of its plumage. The skunk (*Mephitis mephitis*), of course, is well known as a prey species of the Great Horned Owl.—KENNETH C. PARKES, *Laboratory of Ornithology, Cornell University, Ithaca, New York.*

Western Burrowing Owl in Michigan.—The Burrowing Owl (*Speotyto cunicularia*) has "on several occasions . . . been taken outside its normal range" (Bent, 1938. "Life Histories of North American Birds of Prey," Part 2, p. 396). There are several published records for it in Wisconsin (see W. C. Pelzer, 1941. *Passenger Pigeon*, 3: 91 and H. L. Orians, 1948. *ibid.*, 10: July, back cover). R. L. Patterson (1946. *Wilson Bulletin*, 58: 53) has even reported observing a Burrowing Owl flying from ship to ship at sea more than a hundred miles off the mouth of the Gulf of California.

On May 1, 1949, three miles northwest of Chassell, Houghton County, Michigan, Bourdo chanced to encounter a Burrowing Owl along a road. It was on the ground, in open, rather flat farmland. On being stalked it pulled itself erect, as if in an attempt to see the stalker more clearly. Typical of it was a 'pumping' or bobbing motion, particularly of the head. It uttered no sound. After 20 minutes of being observed on the ground it flew to the top of a fencepost about 50 feet away. When flying it held its long legs toward the rear so that they extended well beyond the tail. Standing on the fencepost, it watched Bourdo for some time. It seemed more curious than afraid. It permitted the car to approach slowly to within 15 feet before flying off.

The following day (May 2), we found the owl in almost the same place—standing on a corner fencepost looking out across the hayfields and pasture-lands. After collecting it, we searched in vain for a burrow of any sort. At the base of a fencepost 30 feet north of the spot at which we had shot it we found the fresh remains of a Masked Shrew (*Sorex cinereus*).

The owl proved to be a female. It weighed 183.5 grams. It was heavily infested with *Docophorus communis*, a common biting louse of passerine birds. The stomach contained 8 cc. of mud and food, of which 2.5 cc. were food. The food items were: 1 earthworm, 2 spiders, 4 carabid beetles, 1 unidentified lepidopteran, and remains of 1 unidentified hymenopteran. In the crop were the spinal column (18 mm. long) and a few attached ribs of an unidentified small vertebrate.

The Burrowing Owl specimen is now No. 118,163 in the collection of the Museum of Zoology at the University of Michigan. It is, according to Dr. J. Van Tyne, the first of the species to be recorded in Michigan. It has been identified as the western North American race, *S. c. hypugaea*. A photograph of it has appeared in a recent issue of *The Jack-Pine Warbler* (1950. 28: plate 2).—ERIC A. BOURDO and GENE A. HESTERBERG, *Michigan College of Mining and Technology, Houghton.*

The nest and eggs of *Tolmomyias poliocephalus*.—The tropical New World flycatchers of the genus *Tolmomyias* are small and dull colored, resembling somewhat those of the much better known and more northward ranging genus *Empidonax*. They are, however, rather heavy-billed, in this respect resembling the species of *Rhynchocyclus*. Hellmayr (1927. Cat. Birds of the Americas, Part 5, pp. 273–293) gives all the species of the closely related genera *Tolmomyias*, *Rhynchocyclus* and *Ramphotrigon* the common name Flat-bill, a not very satisfactory appellation.

On July 31, 1949 I spent some time watching a pair of *Tolmomyias flaviventris* (Yellow-vented Flat-bills) building a nest about 1.5 meters above the ground in a coffee shrub near

Paramaribo, Surinam. The nest seemed to be nearly complete and only one bird was building, but the other bird often accompanied it to the nest. When these birds were not present, another small bird came to the nest, alighted on the twig supporting it, pecked until it took some fibres from it, and flew away. The small robber came back again and again, each time taking nest material and always disappearing in the same direction. I was able to trace it and found the beginning of a nest—a few fibres hanging loosely on a twig of a small coffee shrub about 30 meters away.

On August 1 the nest of *T. flaviventris* was in a deplorable state. Much of the material was gone, especially the fine fibres by which it was attached to the twig. On the other hand, the nest of the robber had grown considerably, but I did not see the bird. Next day the last remnants of the nest of *T. flaviventris* disappeared. On August 8 the nest of the still unknown robber seemed to be nearly complete. It was a pouch of typical *Tolmomyias* shape, with entrance below at the side. Just beside it, on the same twig, was a nest of wasps. The presence

Nests of *Tolmomyias flaviventris* (left) and *T. poliocephalus*. Photographed respectively on June 15, 1947 and August 12, 1949 near Paramaribo, Surinam, by F. Haverschmidt. In each nest the entrance is at the lower left.

of these insects made examination of the bird's nest rather risky. There were still no eggs on August 12 although the bird left the nest on my approach.

On August 19 I collected the bird when it left the nest. It proved to be a female *Tolmomyias poliocephalus* (Gray-crowned Flat-bill), a species found about as commonly as *T. flaviventris* in the coastal area of Surinam. I have found it common also in the interior, on much drier, sandier ground, in woods bordering the savannas. In this interior habitat I have never found *T. flaviventris*.

Nothing in the extensive synonymy of *T. poliocephalus* as presented by Hellmayr (*op. cit.*, pp. 282–284) indicates that the nest and eggs of the Gray-crowned Flat-bill have been described. Nehrkorn (1910. Katalog der Eiersammlung, Berlin) does not describe them. The eggs are not in the collection of the British Museum (Oates and Reid, 1903. Cat. Coll. Birds' Eggs in the British Museum, Vol. 3, London) or in the large Penard oölogical collection from Surinam (Hellebrekers, 1942. *Zoologische Mededeelingen*, 24: 260). The nest was retort-shaped with an entrance-tube below the bottom proper. It was suspended from the middle of the

branch and not at the extreme end of it. It was made of fine fibres and dry grasses and had no lining. The 2 eggs, which rested on the fine fibres of the bottom, were fresh, so perhaps the clutch was not yet complete. Their weight was 1.80 and 1.98 grams. They measured 18.4 × 13.2 and 19.1 × 13.4 mm. In ground colour they were creamy white (dead white after blowing). They were marked all over with small reddish spots and blotches. These markings were larger and more numerous at the larger end.—Fr. Haverschmidt, *P. O. Box 644, Paramaribo, Surinam, Dutch Guiana.*

Behavior and habitat of *Thryophilus leucotis* in Central Panamá.—On July 15, 1950, in a damp thicket in the Juan Franco suburb of the city of Panamá, I observed an adult Buff-breasted Wren (*Thryophilus leucotis galbraithii*) feeding an almost full-grown, but still stub-tailed, young bird. Another adult wren was singing close by. For several minutes the adult which I was watching proceeded to work over the top of the young bird's head and back with its bill, as if searching for vermin or preening the feathers. While I had often watched monkeys busy with their social grooming, and seen birds picking ticks from the bodies of mammals, this particular form of bird behavior was new to me.

Thryophilus leucotis is a South American species which reaches its northern limit in central Panamá. In western Panamá and elsewhere in Middle America it is replaced by various forms of the closely related, and very similar, *T. modestus*. The most striking point of difference between the two species is this: in *leucotis* the wing-barring is sharp and black, in *modestus* it is vague and obsolescent. The two birds are so similar morphologically that some ornithologists would doubtless consider them conspecific but for the overlapping of their ranges in central Panamá. In this narrow zone of overlap there appears to be some tendency toward ecological segregation: *leucotis* prefers the more humid thickets, particularly those near water, *modestus* the drier, more open areas, near houses. At the Pacific coast locality mentioned above I heard a singing individual of each species within a hundred yards of each other, one in a wet thicket near a small stream, the other in a dry thicket on an open hillside. Similarly, on the humid, and formerly forested, Caribbean slope of the Canal Zone, *leucotis* has been recorded at the edge of small openings in heavy woodland (e.g., that on Barro Colorado Island), while *modestus* is found along roadsides and in the more extensive clearings. In western Panamá, beyond the range of *leucotis*, *modestus* is often noted in wet tangles and along river borders.

Both species indulge in antiphonal singing and utter a variety of loud, emphatic, whistled phrases which, though similar in basic character, are, according to my experience, sufficiently different in pattern to be distinguishable. *Leucotis* tends to end its phrases with a downward slur or drop in pitch, while *modestus* usually favors a rising or sustained *ee* as the final sound.—Eugene Eisenmann, *Linnaean Society of New York, 11 Broadway, New York 4, New York.*

Some Remarks on West Indian Icteridae.—In his stimulating article, "Convergent evolution in the American orioles" (1950. *Wilson Bulletin*, 62: 51–86), Beecher suggests that two phyletic lines (*Icterus* and "*Bananivorus*") have arisen from "opposite ends" of the genus *Agelaius*. Thought provoking though this concept may be, certain of Beecher's statements relating to West Indian forms appear to me to be open to criticism.

Beecher is evidently of the opinion that *Agelaius* and "*Bananivorus*" entered the West Indies through Cuba from Honduras. He states (p. 59) that "*A. humeralis* may have reached Cuba from the ancestral *thilius* stock of Central America as a typical marsh-dweller when it [Cuba] was emergent in the Early Pliocene." Now, most students of West Indian natural history believe that the majority of species that reached the Antilles from Central America entered the region mainly via Jamaica, an island not shown on Beecher's map (p. 62) depicting evolution in the "*Bananivorus*" group. Jamaica is a "key-island" in any such discussion. The fact that neither "*Bananivorus*" nor *Agelaius* now inhabits this island is of no

consequence when one speaks of early Pliocene invasions. In any case their absence is explained by the presence of *Icterus leucopteryx* and *Nesopsar nigerrimus*. The latter appears to be simply an aberrant *Agelaius* with bill modified for certain unusual methods of feeding (e.g., probing bromeliads). Incidentally, *Nesopsar* is an inhabitant of mountain rain forest and is entirely black in both sexes, although Beecher states (p. 64) that black plumage "seems singularly unadapted for forest-dwelling orioles." Moreover, the species is even more arboreal than *Agelaius humeralis* and *A. xanthomus*, which fact may be explained by the non-existence of extensive or suitable marsh habitat in Jamaica.

Beecher states (p. 59) that "the Recent inundation [of Cuba] accounts for" the arboreal adaptations of *A. humeralis*. It appears more likely, however, that the species was forced from the marsh environment through competition with *A. phoeniceus assimilis*, an Antillean form which is not arboreal. Since three weak-flying monotypic genera (*Cyanolimnas*, a rail; *Ferminia*, a wren; and *Torreornis*, a finch) now confined to the Zapata Swamp have evidently survived the marsh adaptations of the Pleistocene, it is inconceivable that *A. humeralis* was unable to do so.

In regard to West Indian forms of "*Bananivorus*," it appears to me that "*B.*" *dominicensis* reached the Antilles from Central America rather recently (during the Pleistocene), for there are no specific characters serving to separate it from the Central American *I. prosthemelas*, although Hellmayr (1937. Cat. Birds Amer., pt. 10: 117) unites merely the Bahaman *northropi* with *prosthemelas*. I agree with Beecher, and for reasons expressed by him, that the three Lesser Antillean forms should be regarded as distinct species. It appears that mutation has progressed more rapidly on these small islands, possibly as a result of the so-called 'Sewall Wright effect.' The extraordinary distinctness of the numerous races of Lesser Antillean wrens of the genus *Troglodytes* may also be due to this factor.

Finally, I wish to point out that no land bridge or "partial bridge" (p. 73) would have been necessary to account for the forms of *Icterus leucopteryx* on Grand Cayman and St. Andrew's. Hurricanes were far more likely responsible for the presence of this species on these islands.—JAMES BOND, *Academy of Natural Sciences of Philadelphia*.

Records from Brewster County, Texas.—During April of 1949 my wife and I saw 119 species of birds in Brewster County, Texas. I am obliged to Dr. Josselyn Van Tyne for going over our notes and suggesting which observations are of sufficient interest to place on record. We collected no specimens. The geographical and ornithological nomenclature of our list follows, for the most part, that of Van Tyne and Sutton (1937. "The Birds of Brewster County, Texas," *Misc. Publ. Univ. Mich. Mus. Zool., No.* 37). Other papers which we have consulted are those of Borrell (1938. "New Bird Records for Brewster County, Texas," *Condor*, 40: 181–182), and of Stevenson and Smith (1938. "Additions to the Brewster County, Texas, Bird List," *Condor*, 40: 184).

Pied-billed Grebe (*Podilymbus podiceps*). One which we saw on the Rio Grande near Hot Springs on April 18 appears to be the only spring record for the county. Borrell (1938) and Stevenson and Smith (1938) have recorded it in the fall.

American Egret (*Casmerodius albus*). Three seen wading in the river near Boquillas on April 26. The species has been identified with certainty in Brewster County on two other occasions (Van Tyne and Sutton, 1937: 12–13).

Spotted Sandpiper (*Actitis macularia*). Seen three times along the Rio Grande, a single bird on each occasion. Our earliest record (one at Hot Springs, April 18) is considerably earlier than other published records.

Greater Yellow-legs (*Tringa melanoleuca*). A single bird observed at close range and heard calling along the Rio Grande near Hot Springs on April 18 is apparently the first of this species recorded in the county. It was chased off by a Duck Hawk (*Falco peregrinus*) which made several unsuccessful stoops.

Inca Dove (*Scardafella inca*). Two seen between Persimmon Gap and the Chisos on April 16. The species has been recorded regularly along the Rio Grande but not, heretofore, elsewhere in the county.

Barn Owl (*Tyto alba*). On April 23 one was picked up dead near the cabin of the Big Bend Park engineer. This cabin is located at the base of the Chisos Mountains near the junction of the road to Terlingua and that leading up into the Basin.

Great Horned Owl (*Bubo virginianus*). One was heard calling in the Chisos each night from April 24 to 27 inclusive.

Whitney's Elf Owl (*Micrathene whitneyi*). Elf Owls were heard calling around the Basin on April 17, 18, 21 and 22. These dates are all earlier than any previously recorded for the species.

Poor-will (*Phalaenoptilus nuttallii*). Two to four were heard calling almost nightly in the Basin between April 16 and 30. The earliest date previously published for the species is April 26.

Ash-throated Flycatcher (*Myiarchus cinerascens*). This species was common over most of the county. We found a nest with eggs in the Chisos on April 21.

Olive-sided Flycatcher (*Nuttallornis borealis*). One carefully observed and heard calling on the Lost Mine Trail in the Chisos, April 30. Published spring records for Brewster County are all for May and early June.

Bank Swallow (*Riparia riparia*). Two birds seen at close range near Santa Elena Canyon, April 17. The only two published records for this species in Brewster County are in May.

Veery (*Hylocichla fuscescens*). Since no specimen of this species has ever been collected in Texas, it must remain on the hypothetical list. I am sure, however, that it occurs. On April 29 in willows along the Rio Grande near Boquillas I heard a distinctive *vu* which I at once recognized. After a brief search I saw a thrush. I was so close that I could clearly discern the uniform cinnamon-brown back and tail and sparsely-spotted whitish breast.

Black-capped Vireo (*Vireo atricapillus*). We saw one of these attractive vireos on the Lost Mine Trail in the Chisos on April 30. Van Tyne and Sutton (1937: 80) record it only from the Glass Mountains in the northern part of the county.

Nashville Warbler (*Vermivora ruficapilla*). Two seen near Casa Grande in the Chisos Mountains, April 30.

Orange-crowned Warbler (*Vermivora celata*). Two seen in the upper part of Pine Canyon, April 30.

Colima Warbler (*Vermivora crissalis*). Two seen in the higher part of Pine Canyon in the Chisos Range, April 30. This should not be taken to indicate the scarcity of the species, since we spent very little time on the higher slopes where this bird lives.

American Redstart (*Setophaga ruticilla*). A male was seen in the Basin of the Chisos on April 25. The species has been recorded four times in Brewster County, three times in May, once in August (Van Tyne and Sutton, 1937: 88–89).

Hepatic Tanager (*Piranga flava*). We saw a beautiful male on the side of Casa Grande on April 28. The earliest spring record for this species otherwise is May 3 (Van Tyne and Sutton, 1937: 96).

Black-headed Grosbeak (*Pheucticus melanocephalus*). One appeared in the Basin on April 22 and was seen almost daily to the end of the month. This arrival date is the earliest on record for the county. Sutton collected a male in the Basin on April 30, 1935 (Van Tyne and Sutton, 1937: 98).

Painted Bunting (*Passerina ciris*). One was seen near the house of the park engineer as early as April 21.

Pine Siskin (*Spinus pinus*). Four were seen in Pine Canyon on April 30.

Baird's Sparrow (*Ammodramus bairdii*). We saw one near Marathon on May 1. The species has previously been recorded three times in Brewster County.

Song Sparrow (*Melospiza melodia*). We carefully identified one at Hot Springs on April 18. The species has been recorded from Brewster County four times previously.

McCown's Longspur (*Rhynchophanes mccownii*). We saw a beautiful male near Marathon, May 1. The species has been recorded from Brewster County heretofore only in mid-April (Van Tyne and Sutton, 1937: 114).—ALLAN D. CRUICKSHANK, *Highland Hall, Rye, New York.*

NEW LIFE MEMBER

Robert Albert McCabe was born in Milwaukee, Wisconsin on January 11, 1914. He received his bachelor's degree from Carroll College, in Waukesha, Wisconsin in 1939. His graduate work was done under Aldo Leopold at the University of Wisconsin. For a time he was game manager at the Faville Grove Wildlife Area and biologist for the University of Wisconsin Arboretum. In 1946 he joined the staff of the University's Department of Wildlife Management. He has published several papers on game birds and mammals. Field work has taken him to México and Canada. He is now studying the ecology and population behavior of several birds and mammals. The Alder Flycatcher (*Empidonax traillii*) has long been of special interest to him. A paper by him on that species is soon to appear in *The Wilson Bulletin.*

EDITORIAL

Members of the Wilson Club who attended the Ninth International Ornithological Congress in France, in 1938, are not surprised to learn of the success of the Tenth Congress, the formal sessions of which were held June 10 to 17, 1950, at Uppsala, Sweden. Alexander Wetmore served as president, and Sven Hörstadius, of the University of Uppsala, as general secretary. The program included sessions devoted to evolution and systematics, migration and orientation, population dynamics, behavior, regional faunas, paleontology and anatomy. There was a round table discussion of bird banding. Headquarters were the student commons, 'Värmlands Nation,' at the University, and meetings were held in certain University rooms and a large hall adjacent. The 350-some persons who registered represented more than 25 countries. Just before the Congress there were excursions in southern Sweden, the University at Lund serving as a base. During the meetings there were visits to the forested country north of Uppsala, to certain islands off the coast, and to the town and country homes of Linnaeus. These last are maintained as public shrines. After the meetings there were long trips to Abisko and Ammernäs in Swedish Lapland. North Americans in attendance were the Arthur Allens, Dean Amadon, the Edward Chalifs, Lee Crandall, Jean Delacour, Herbert Friedmann, the Alfred Grosses, Mrs. J. Kelly, the F. C. Lincolns, the Hoyes Lloyds, the Robert Murphys, the Walter Naumburgs, the Roger Petersons, the Richard Poughs, the Dillon Ripleys, W. E. C. Todd, the Carll Tuckers, Josselyn Van Tyne, the C. Vauries, the William Vogts, and Alexander Wetmore. The W. H. Phelpses, both senior and junior, were there. The Phelpses divide their time between the United States and Venezuela.

As additions to, and replacements in, the committee of 100 forming the permanent body of the Congress, the following were elected: representing Canada, Hoyes Lloyd and L. L. Snyder; representing Venezuela, W. H. Phelps, Sr.; representing Brazil, Oliverio Pinto; representing Colombia, Armando Dugand; representing Chile, R. A. Philippi, B.; representing the United States of America, H. G. Deignan, A. H. Miller, A. L. Rand and J. Van Tyne. Dr. Wetmore was the Chairman of the official United States delegation named by the State Department.

The next congress will be held in Switzerland in 1954 and A. Landsborough Thomson, of England, will serve as president.

We are glad to learn from our newly appointed Membership Committee that a special effort is being made to increase the size of the Club. An outsider attending one of our meetings would hardly say that we needed more members—but we do. Every new member adds appreciably to our stature, knowledge, and power. The larger our Club the larger our *Bulletin* and the greater our influence. The best members are those who join not as a personal favor, but because of their abiding love for, and interest in, birds. If you know some one who should be a member send the name and full address of that person (typed or printed clearly, with the Miss, Mrs., Mr., or Dr. clearly indicated) to any of the following Membership Committeemen:

Seth H. Low, Chairman, Patuxent Research Refuge, Laurel, Maryland
Ralph M. Edeburn, Assistant Chairman, Marshall College, Huntington, West Virginia
Aaron M. Bagg, 72 Fairfield Ave., Holyoke, Massachusetts
Donald J. Borror, Dept. of Zoology and Entomology, Ohio State University, Columbus
Robert C. Conn, 769 Park Ave., Bound Brook, New Jersey
Fred T. Hall, Davenport Public Museum, Davenport, Iowa
Hal H. Harrison, 1102 Highland Street, Tarentum, Pennsylvania
Theodora G. Melone, Geology Library, University of Minnesota, Minneapolis
Harold D. Mitchell, 378 Crescent Ave., Buffalo 14, New York
Mrs. Dorothy Neal, P. O. Box 133, Demorest, Georgia

Four times a year *Bulletin* readers look at the black-capped warbler on the front cover—but how well do they know the bird? Though described in 1811, it has not been studied much, especially on its breeding ground. A paper on its nesting, accompanied by excellent kodachromes, has been submitted to us. We would like to reproduce one of the kodachromes in full color in 1951.

A color-plate costs at least two hundred dollars. The earnings of our Endowment Fund are large enough to meet the cost of one color-plate a year and this plate has been, traditionally, the frontispiece for the March issue. The color-plate for March, 1951 has already been arranged for, but we would like to present a Wilson's Warbler plate in June or September. We appeal, therefore, for contributions. We hope that further moneys for this color-plate fund may be obtained through auctions of original bird drawings. Since members of the Club may desire copies of the Crimson-collared Grosbeak picture in this issue, we have had an extra supply run off. These we are selling at twenty-five cents each. This money will go into the color-plate fund. Send your order to the editors.

Just as we go to press word reaches us of the death, on October 31, 1950, of Gertrude A. (Mrs. Henry J.) Nunnemacher, of Milwaukee, Wisconsin. Although never actually a member of the Wilson Club, Mrs. Nunnemacher was interested in birds all her life. Especially interested was she in the birds of México, a country she and her husband visited many times. The colored frontispiece in this issue of *The Bulletin* was made possible through her generosity. We hope that her relatives and friends, as well as members of the Club, will enjoy this picture.

Glowing with pride, we learn that the splendid new biology building at West Virginia University is to be named Brooks Hall—"in honor of the Brooks family of Upshur County whose sons have contributed extensively to West Virginia's biological research and to the state's biological literature." The four distinguished brothers, Alonzo Beecher Brooks (known to all his friends as 'A.B.'), Fred Ernest Brooks, Chandler Linn Brooks, and Earl Amos Brooks have, indeed, been great West Virginians, every one of them. And the son of the second of these brothers is our own Maurice Graham Brooks.

By invitation the Wilson Ornithological Club was officially represented at the inauguration of Dr. Gordon Gray as President of the Consolidated University of North Carolina, at Chapel Hill, October 8–10. Maurice Brooks asked Eugene P. Odum to serve us in this capacity. Dr. Odum has been a member of the Club's Council and he is now on our Editorial Committee. He is a graduate of North Carolina. His father, Howard W. Odum, is one of the most distinguished professors on the faculty of that university.

The following have been appointed as the Club's Conservation Committee: Robert A. McCabe, Chairman, William W. H. Gunn, Henry S. Mosby, William H. Elder, and Charles M. Kirkpatrick.

I. B. Boggs, of Morgantown, West Virginia, has consented to serve as a member of the Club's Endowment Committee. Leonard C. Brecher, of Louisville, Kentucky, is Chairman.

Making certain that a species of bird does *not* occur in a given area at particular seasons is far harder than ascertaining that it does, but knowledge of this sort is important and should not be neglected. From evidence of occurrence, and from that alone, we have long assumed that the House Wren (*Troglodytes aëdon*) is replacing the Bewick's Wren (*Thryomanes bewickii*) in many places because the latter cannot compete with the former. Yet is it not possible that the reverse is true: that the House Wren can gain a foot-hold only after the Bewick's Wren has declined in numbers? Wilson Club members living in regions now occupied by the Bewick's

Wren, but threatened by southward spread of the House Wren, can make a real contribution to the solution of this problem by determining the population and density trends of the Bewick's Wren in their regions *now*. The Baltimore Oriole (*Icterus galbula*), too, is to be watched. Is it disappearing from the southern part of its breeding range? And what bird species are being affected by the southward spread of the breeding of the Cowbird (*Molothrus ater*)?—Allan R. Phillips.

In a recent issue of *Bird-Banding* (1950. 21: 105–11), B. M. Shaub reported that the repeat behavior of Greater Redpolls at banding traps was notably different from that of Common Redpolls. "The Greater Redpolls repeated on an average of 9.6 times per individual [during a 35-day period] while the Common Redpolls repeated only 0.2 times per individual." Mr. Shaub has not given his birds scientific names, but he obviously thinks of these two Redpolls as distinct species. We wish that he had preserved at least two of the heaviest of his Greater Redpolls—one as a skin and one as a skeleton. The morphological characters of these specimens would be of great interest and value to taxonomists.—G. M. S.

Dr. Herbert Friedmann, Curator of Birds at the U. S. National Museum, is in Africa continuing his study of the parasitic breeding habits of birds. He is travelling through South Africa and southern Rhodesia, focussing his attention upon the Indicatoridae, the Honeyguides. En route to Africa he visited museums in Denmark, Holland, Belgium, France, Italy and England. His work is supported by grants from the American Philosophical Society and Guggenheim Foundation.

From Dr. A. J. Marshall of St. Bartholomew's Hospital Medical College in London comes this appealing letter, dated September 1: "I wonder if you could help me? I borrowed No. 4 of Volume 61 (December, 1949) of *The Wilson Bulletin* from the Library of the London Zoo—and, god help me, I've just spilt an enormous mug of tea over the damned thing. The combination of strong Australian-brewed tea and glossy American paper doesn't augur well for a final neat English binding and so in order to prevent an international incident between this Department and the Zoo I wonder could you please let me have a copy to give them? If you have one to spare I will arrange for some American friend to send the 50 cents in order to avoid the usual delay in transmitting money to the U. S." The needed copy has been received by Dr. Marshall.

The editors are grateful to the following for assistance in preparing for publication the material presented in this issue: John W. Aldrich, Aaron M. Bagg, William L. Brudon, L. Irby Davis, Eugene Eisenmann, Herbert Friedmann, John L. George, Mr. and Mrs. Richard R. Graber, William A. Lunk, A. D. Moore, Margaret Morse Nice, Robert W. Storer, James T. Tanner, and Dale A. Zimmerman. They are especially grateful to Elsa Hertz for her cheerful willingness to retype manuscripts.

ORNITHOLOGICAL LITERATURE

STUDIES IN BIRD MIGRATION, BEING THE COLLECTED PAPERS OF H. CHR. C. MORTENSEN, 1856–1921. Edited by Poul Jespersen and Å. Vedel Tåning. Published by Dansk Ornithologisk Forening, Ejnar Munksgaard, Copenhagen, 1950: 10 × 6½ in., 272 pp., with 32 photos, 12 figures, and 10 maps. Paper. Dan. kr. 18.

This publication in English of the collected papers of H. Chr. C. Mortensen honors this pioneer of bird banding on the 50th anniversary of his first intensive banding efforts. Like many European scientists, he was a schoolmaster who devoted all his spare time to research. His innovations were numerous. He was the first to band birds in large numbers for the specific purpose of studying migration. His initial attempts in 1890, with zinc bands, were unsuccessful. He then designed aluminum bands and in 1899 marked 165 Starlings (*Sturnus vulgaris*). He stamped numbers and letters on the bands so that each banded bird could be identified with certainty if retaken. He experimented with color banding and tail clipping in order to study individual breeding birds. Realizing the necessity for publicity if his work was to succeed, he corresponded with ornithologists at home and abroad, seeking their cooperation.

Many of the facts which Mortensen obtained by close observation have long since become general knowledge. The important point is that his careful observations were published for the information of other ornithologists. He recorded the following observations on subjects which now are considered essential in serious field studies: the manner of feces disposal at the nest of a Starling (pp. 26–27); the return of marked Starlings (p. 27) and White Storks (*Ciconia ciconia*) (pp. 208–216) to the same breeding areas in subsequent years; pre-migration wandering of young Buzzards (*Buteo buteo*) (pp. 39 and 59) and Kites (*Milvus milvus*) (p. 59) in different directions from the breeding area; brood size in *Buteo buteo*, and the presence of weaker nestlings "always . . . in the broods" (p. 108); the importance of stork pellets for food analysis. He began a skin and skeleton collection for the study of plumage and age differences. He foresaw the future need for international laws protecting waterfowl (p. 173).

His observations led him to ask the following questions about migrants (p. 45): "Where do they come from and whither do they go? How do they know their way? How high in the air do they go? How many miles do they travel in an hour? What moves them to change their place? Do the young or the old first leave the district or do they accompany each other?" In order to learn more about the status of migrants he sent well-considered questionnaires to those who found his marked birds. He soon learned that storks and birds of prey brought him more returns than did passerine birds. Through data gathered on the direction of migration from Denmark, he was able to report on the winter home of certain species, notably the Green-winged Teal (*Anas crecca*) and White Stork.

Any field worker who has tried to trap and band adult birds at their nests will be impressed by Mortensen's ingenuity in designing self-emptying traps for Starlings (pp. 74–79). Due to his knowledge of the habits of the Starling, he trapped 160 of them in one month.

Perhaps of equal value to the scientific contribution made by a man is the philosophy which motivates him. It is fitting, therefore, in reviewing a memorial volume honoring this pioneer ornithologist, to quote two passages from him. "Every human being has the need of spiritual revival through communion with the unfalsified, Wild Nature!" (p. 228). "And when this puzzle is eventually solved, new ones will arise and stimulate the enthusiasm of those who study the manifold ways of life and seek to understand them. There is something very satisfying about getting an answer from Nature to one's questioning—if one has asked in the right way!" (p. 65).

The anthropomorphism appearing at times in Mortensen's papers is now passé, but this can be overlooked by the reader who considers the date of writing and recalls that this style

has not yet completely disappeared from our own ornithological literature. The papers are primarily of historical interest—so great has been the progress in banding with its concomitant contribution to our knowledge of migration! At the same time, Mortensen's thoroughness and persistence should give encouragement to those now exploring new aspects of bird study. Students of life histories, banding and related problems will find many pertinent tips in his papers.

It is unfortunate that the translation was not into idiomatic English.—Andrew J. Berger.

BRITISH WADERS IN THEIR HAUNTS. By S. Bayliss Smith. Illustrated with 53 photographs by the author and 26 by other photographers, with three plates of waders in flight drawn by Basil Laker. G. Bell & Sons, Ltd., London, England, 1950: $7\frac{1}{4} \times 9\frac{3}{8}$ in., ix + 162 pp. $5.25. Obtainable through British Book Centre, 122 East 55th Street, New York 22, New York.

The photographic illustrations of this book are extraordinarily good. Some of them are clear, well lighted portraits of individual birds at rest; others show pairs at or near the nest; others are of close-knit flocks feeding, preening or dozing. Very few show the birds straddling or settling over their eggs, and not one is of a parent bird standing near a tethered young one. As the author states in his foreword, "nine out of ten photographs of birds are normally taken at the nest." The trouble with so many bird-at-nest photographs is that they do not present the bird in an average attitude. In the worst of them the brooding bird is panting from the heat because the sheltering vegetation has been cut away. In many of them the feet and lower part of the body are hidden by the nest. In even the most pleasing of them the bird has an instantly recognizable broodiness which is a good deal the same no matter what the species. In this book the photographs represent almost every activity of the adult shorebird. Especially vivid and interesting is F. P. J. Kooymans' study of two Ruffs (*Philomachus pugnax*) on their tilting round in the Dutch polders (dike-protected areas of low land). The birds have struck quite different poses—one standing high, the other crouching—but the raising of neck-plumage and the sham parrying and thrusting have obviously begun. The author's own study of a mass of shorebirds edging discreetly away from a Black-backed Gull (*Larus marinus*) is excellent in composition and inexplicably humorous. J. E. Sluiters' Wood Sandpiper (*Tringa glareola*) standing in shallow water (p. 103) is a well nigh perfect study of a wader and its distorted reflections. Experts in field identification will revel in such group photographs as that on page 117. The species have been carefully identified by the author, but no good field-student can look at the picture without identifying the birds all over again—for himself.

The photographs are of considerable taxonomic value. Studying them, one senses how color-patterns and body attitudes reveal degrees of relationship. It is highly doubtful that any ornithologist could, on examining the photograph by J. V. Vijverberg on page 104, without knowing where it had been taken, tell whether the bird was a Green Sandpiper (*Tringa ocrophus*) or a Solitary (*T. solitaria*). There are those, indeed, who now believe that these two birds actually belong to the same species. The similarity of the Common Sandpiper (*Actitis hypoleucos*) to the Spotted Sandpiper (*A. macularia*) is instantly revealed in Stanton Whitaker's excellent study of the former (p. 102). Subtle differences are revealed through a comparison of Mr. Whitaker's photograph of the Common Curlew (*Numenius arquata*) on p. 65 and T. M. Fowler's beautiful study of the Whimbrel (*N. phaeopus*) on p. 66.

The text explains in detail how Mr. Smith obtained his remarkable pictures. Placing the firmly built hide (blind) securely in an advantageous place, he remained inside it until the incoming tide drove the unsuspecting birds toward him and his camera. Some of his best photographs were made from a hide which had been in place so long that it was an accepted part of the shorebirds' habitat. He found that the size, shape and color of the hide did not

matter so much in early autumn as later in the year. He regards the wind as the greatest enemy of the estuary photographer. He recommends a reflex camera and considers a long focus lens "an absolute necessity." He likes to work in strong sunlight. Intrigued as he is by recording the "intense vivacity" of high-stepping Redshanks (*Tringa erythropus*), scurrying Dunlins (*Erolia alpina*) and restless Oystercatchers (*Haematopus ostralegus*), he seeks conditions which will make possible the snapping of scene after scene with exceedingly brief exposures.

An interesting and valuable part of the book is the brief historical account of mankind's study of the shorebirds. In the early days so little was known about the several plumages of certain species that odd, even funny, names came into wide use. There were, for example, Red, Cinereous, Lesser and Cambridge Godwits; Red-legged, Ash-coloured, Brown, Greenwich and Aberdeen Sandpipers; Purres; Gambets; and so on. Careful bird students may comment that we are not very thoroughly enlightened, even today, about certain plumages and plumage-sequences; but at least we know much more than we did a century ago about the year-round distribution of the shorebirds. Within the memory of most persons who read his review the nests of certain shorebirds were for the first time found. At least two species have kept their nesting-grounds a secret—the Sharp-tailed Sandpiper (*Erolia acuminata*) and the Gray-rumped Sandpiper or Tattler (*Heteroscelus brevipes*). The author's reference to the discovery of the eggs of the Curlew Sandpiper (*Erolia ferruginea*) in Alaska must be a mistake. This species has been recorded several times along the coasts of Alaska and British Columbia, and it has been encountered in summer on Bering Island in the Komandorski group, but its eggs have never been found in Alaska.

The book closes with three useful plates showing shorebirds in flight, and a supplement in which the length, plumage and diagnostic characters, call notes, displays, food, distribution, movements, habitat out of nesting season, habitat in nesting season, nest, eggs, and incubation of all British shorebirds are briefly discussed.—George Miksch Sutton.

AUDUBON'S BIRDS OF AMERICA. Introduction and Descriptive Captions by Ludlow Griscom. Popular Edition. The Macmillan Company, New York, 1950: 5½ × 8 in., 320 pp., 288 numbered colored plates. $2.95.

This is another in the series of ever smaller and less expensive presentations of Audubon's Birds of America brought out by the Macmillan Company. The plates chosen for reproduction have been decreased to 288. The reduction in number, as is pointed out in the introduction, has been accomplished by the elimination of erroneously recorded and "lost" species, as well as some others which are obscure or seldom seen. This is in line with the popular aim of the book. An innovation in this series is the arrangement in current taxonomic order of the species included.

Griscom's introduction provides a convenient thumbnail sketch of Audubon's life and work. This will prove new, however, only to readers with the barest knowledge of the subject. The introduction serves mainly as a vehicle for a 7-page discussion of conservation and ecological principles in general. Notwithstanding the fact that this is aimed at the lay reader, there are still a few statements which will not go uncontested by ornithologists. The assertion on page 23, for example, "By 1920 every North American bird was protected . . ." is of course untrue. And on page 27, "The balance of nature in a natural community is such that the community continues forever. This is accomplished by keeping the numbers of each living creature in a proper proportion," is in need of clarification.

As regards the pictures, which are the primary reason for the book's existence, it is unfortunate that most of the reproductions range from mediocre to extremely poor. A definite loss of quality is to be expected with such great reduction, yet this does not excuse the complete lack of color fidelity and the poor register of many of the plates. On the publishers' jacket

appears the somewhat arbitrary statement, "John James Audubon was probably the greatest of American naturalists and undoubtedly the greatest of all bird painters." Let us hope that this singular praise does not have to be substantiated by the present reproduction of his work. "The . . . work," according to the introduction, "is designed to bring a selection of Audubon's paintings within the reach of all, so that everyone, even high school students, can get a glimpse of his decorative artistry and genius." It will be unfortunate if "even high school students" come to believe, thereby, that a Wilson's Plover (p. 144) is yellow, a dowitcher (p. 163), bright pink, or a Chuck-will's-widow (p. 215), a hue best described as chartreuse—to mention only a few.

The key numbers have been omitted in several cases where two or more species are shown on a single plate, so that the reader has no way of matching the birds illustrated with the numbers in the accompanying captions. In one instance (Bank and Violet-green Swallows, p. 236), numbers 1 and 2 both refer to Bank Swallows in the plate, while number 2 in the caption refers to the other species.

In all fairness it must be added that a few of the plates are quite creditable. Perhaps some readers will be stimulated by this book to learn more of an interesting and gifted historic figure.—Robert M. Mengel.

WILDFOWLING IN THE MISSISSIPPI VALLEY. By Eugene V. Connett, Editor. D. Van Nostrand Co. New York, 1949: $10\frac{1}{4} \times 7\frac{1}{2}$ in., xvi + 387 pp., 87 half-tones. $12.00.

This book is a collection of articles, essays, and stories about waterfowl along the Mississippi Flyway. Appropriately, it opens with a broad discussion of this flyway by Mr. Frederick C. Lincoln, who takes the reader from the Arctic Ocean to the Gulf of México. In discussing the decline of waterfowl, he points out that "the take of birds by the hunters of this flyway in the 1947 season had increased by nine percent, although the number of hunters had increased only two percent" (page 18). This greater efficiency of gunners in the harvest is one of the most vexing problems of our time.

A chapter, *The Breeding Grounds of the Mississippi Flyway*, by Bertram W. Cartwright is disappointing because of the way it overlaps Mr. Lincoln's discussion. Then again, here was a wonderful opportunity to present a clear picture of the breeding grounds to sportsmen in the light of new information: a challenge Mr. Cartwright did not accept.

Following these 2 chapters on the Flyway and its breeding grounds are 16 chapters on wildfowling, one each devoted to 3 Canadian Provinces and 13 states in the Flyway. Each chapter is written by a different local sporting authority, and there is a wide range of value in these accounts, as might be expected from an assortment of authors ranging from duck camp operators to professional naturalists. At least 2 chapters are valuable contributions to our wildfowl literature. Jack W. Musgrove gives us a detailed story of gunning in the old days, as this was recorded from old-timers.

The chapter on wildfowling in Missouri, by Leonard Hall, is an earnest, careful, clear statement on the waterfowl situation and a sportsman's reaction to current conditions. Here the non-shooting naturalist may inspect the temper and judgement of the gunner who takes sportsmanship to be an important part of his life and character.

The chapter on *Research on Wildfowl*, by Kenneth H. Smith, describes the work of the Illinois Natural History Survey, whose activities have had such a profound influence on waterfowl policy and management in the Mississippi Valley. It is pleasing, in this day and age when so much stress is placed on the bag, to see the last 2 chapters devoted to the arts and sciences of wildfowling, such as duck calling and decoy making. The duck hunter with a duck call, like the fisherman, has a good time practicing, even if the bag is light. Although it is something which cannot be measured, those who have made a study of wildfowling seem to agree

that the man who is a careful, conservative hunter is the same man who is skilled in the crafts of his sport, the man who makes his own equipment and who calls his own birds.—Albert Hochbaum.

50TH CHRISTMAS BIRD COUNT. John W. Aldrich, Editor. Published by the National Audubon Society in collaboration with the U. S. Fish and Wildlife Service. April issue of *Audubon Field Notes*, vol. 4, 1950: 144 pp. (43–188), 8 half tones, 2 maps, paper cover. $1.00. A special reprint of the section on "instructions for making bird population studies" may be obtained for fifteen cents from the National Audubon Society, 1000 Fifth Avenue, New York, New York.

On the fiftieth aniversary of the Christmas Bird Count, which was originated by Frank Chapman as a substitute for the "Christmas Hunt", appears this special issue of *Audubon Field Notes*. The issue contains not only the result of the most recent counts but also the following: a history of the Christmas Count; a summary by Chandler S. Robbins of the largest counts of individual birds; instructions for making such bird population studies as the Christmas Count, the Winter Population Study, and the Breeding-bird Census; and a preliminary bibliography of articles based on the Christmas Counts. Thus, the issue is a reference work which should be kept handy by all those interested in quantitative bird studies.

The Christmas Count has been a tremendous success if for no other reason than that it has stimulated interest in birds. Only 27 persons took part in the first Count, while nearly five thousand participated in 1949. It would be impossible to measure the interest and enthusiasm generated during these annual counts, or to estimate the number of bird clubs which have come into being as a result of them. One observer, Charles H. Rogers, has participated in all fifty counts and Harry B. McConnell in all but one. These are indeed remarkable records, and there are many other individuals who have taken part over long periods.

The scientific value of the great mass of data accumulated in the 50-year span has not been fully determined. Only a few workers, notably Leonard Wing, have attempted large scale analyses. Some attempts to make use of the data have been disappointing because of the large number of variables encountered. For example, let us assume that more Mourning Doves were reported from certain localities in Ohio in 1949, a warm winter, than were reported from the same localities in 1940, a severe winter. At first glance the significance of the figures would seem to be obvious—that there were, indeed, more Mourning Doves in certain parts of Ohio in the mild winter of 1949–50 than in the severe winter of 1939–40. But were the samples, for either year, large enough? Did large concentrations of doves unduly influence the totals? Was coverage of the areas the same in the two years, or was it much more complete in 1949 than in 1940? Was more dove habitat covered in 1949 than in 1940? And so on. Where data can be shown to be truly comparable, and where other data (banding, censuses) can be correlated, confidence may be placed in the Christmas Counts. *All by themselves* the Counts probably have little scientific value. Results of recent years, where percentage of habitat has been indicated and where coverage has been uniform and complete, probably will prove to be much more usable than the indiscriminate listings of earlier years. One has the feeling that there is more gold buried in the mass of data than has yet been uncovered.—Eugene P. Odum.

THE SAGA OF THE WATERFOWL. By Martin Bovey. The Wildlife Management Institute, Washington, D. C., 1949: 8 × 10½ in., xiv + 140 pp., 3 figs., 71 unnumbered plates. $5.00.

This attractive volume follows a number of recent books ("This Plundered Planet," Osborne; "Road to Survival," Vogt; "North American Waterfowl," Day) which have sought to point out the importance and the extreme urgency of conserving our natural resources.

Unlike the first two mentioned, it is concerned primarily with waterfowl; but that all are intimately related is evident. The physical factors upon which the conservation of waterfowl is based are of far-reaching importance to mankind as a whole. Bovey's approach, unlike that of the other authors mentioned, is mainly pictorial. If the old proverb "one picture is worth ten thousand words" has validity, this becomes a book of considerable content and importance.

This, then, is a picture book. After a brief foreword by the author, a list of illustrations and credits, and three attractive scratch-board vignettes by F. L. Jaques, the book consists mainly of photographs of wildfowl, and things pertaining to the history, destruction, and conservation of wildfowl. These are accompanied by a brief, running commentary. The arrangement is such as to present a graphic, fast-moving history of the wilderness that was, of the invasion of this continent by man, of the inevitable changes which ensued, and of the disastrous decrease of the ducks and geese. Then come the beginnings of the conservation movement, a period of hope, and a protrayal of the perilous situation which still exists today.

The author has done a good job. The commentary has an attractive, rhythmic quality, and the photographs, largely by Bovey or his sons, are excellent. A number of them are superb and go a long way towards achieving the effect of "ten thousand words." The book is competently printed on paper of moderate quality. Any changes which might be made would be, I think, matters of artistic opinion. I can find little requiring criticism. The price of five dollars may be a little high for a book of this size and type.

Many students of nature will wish to possess this book simply for the beauty of its contents. All wildfowlers who give sincere consideration to the future of their sport should have it, and it is to be hoped that they will circulate it widely among their less thoughtful friends. —Robert M. Mengel.

THE WILSON ORNITHOLOGICAL CLUB LIBRARY

The following gifts have been recently received. From:

William H. Behle—8 reprints
G. Reeves Butchart—1 bulletin
Clarence Cottam—6 bulletins
Eugene Eisenmann—1 reprint
Adrian C. Fox—2 books
Karl W. Haller—1 book
Leon Kelso—2 pamphlets
Emerson Kemsies—2 reprints
Charles W. Kossack—1 reprint
Ernst Mayr—3 reprints
Urban C. Nelson—3 reprints
Margaret M. Nice—6 books, 24 reprints
Fred M. Packard—1 book
Kenneth C. Parkes—3 reprints
Homer W. Phillips—2 reprints
Richard S. Phillips—4 reprints
J. Van Tyne—5 reprints
F. A. Ward—2 magazines
James B. Young—1 reprint
F. R. Zimmerman—1 reprint

CONSERVATION DEVELOPMENTS IN AMERICAN UNIVERSITIES

Conservation of natural resources has become a topic of steadily growing interest in many spheres of American life—among government agencies, book publishers, the public schools, and the general public, to mention only a few. It has become a matter of international concern, as attested by the Inter-American Conference on Conservation of Natural Resources held in Denver in September, 1948 (proceedings published and available), and the United Nations Scientific Conference on Conservation and Utilization of Resources held at Lake Success in August and September, 1949 (published proceedings now being issued). American colleges and universities have long played an important role in encouraging this increasing interest, and have frequently initiated new courses, curricula, and sometimes organizational units concerned with conservation. The recent reorganization and expansion in four major American universities in the conservation field may be of interest as an indication of this trend.

Cornell University in 1948 established a Department of Conservation in which were included its activities in fisheries, wildlife management, and forestry, together with all work in the background sciences of ornithology, mammalogy, ichthyology, and herpetology. While the new department was largely a reorganization of pre-existing activities at the University, it did include sufficient new support to permit the establishment of several new positions, involving teaching and research in wildlife management, oceanography, and fish culture, and extension work in fish and wildlife conservation.

About 65 undergraduates and 40 graduate students are majoring in the Department of Conservation in the various different specializations available. The undergraduate curriculum has been divided into four different specializations, depending upon the requirements of the students in question: fishery biology, wildlife management, conservation education (both for those who intend to teach in the conservation field or engage in general public relations or general education activities), and a curriculum in vertebrate zoology for those whose primary interest is ornithology, mammalogy, or other aspects of vertebrate zoology. Most of the students are encouraged to do some postgraduate work.

Michigan State College in December, 1949, established a Division of Conservation to coordinate all of the teaching, research, and extension activities in the field of conservation offered by the institution. The new Division of Conservation includes four departments: the Fisheries and Wildlife Department, Forestry Department, Department of Wood Utilization, and a Conservation Institute which offers work in park management, rural land use, soil and water conservation, and conservation administration. The new Division of Conservation administers a number of study and demonstration areas, including the Kellogg Bird Sanctuary, which is already well known to ornithologists. Its present technical staff totals about 60 men, and specialists in a number of additional fields are still being recruited.

The **University of Michigan** in 1950 organized a new School of Natural Resources which expanded and replaced the old School of Forestry and Conservation. Five curricula are offered—forestry, wood technology, wildlife management, fisheries, and conservation—each leading to the degree of Bachelor of Science. A fifth year is strongly recommended for those who desire full professional training.

Graduate work leading to the degree of Doctor of Philosophy or Doctor of Science is provided in any branch of the five major fields covered by the School. The School also emphasizes non-professional instruction relating to natural resources which will be of interest to students throughout the University. Special attention will be given to the philosophy and principles underlying the conservation of natural resources. Included in the new School is a newly established Charles Lathrop Pack Chair of Conservation, which has been filled by the appointment of Dr. Stanley A. Cain.

Yale University, with the cooperation of the Conservation Foundation, has established a new Chair of Conservation to which Dr. Paul B. Sears has been appointed, and has initiated in 1950–51 a graduate course leading to the Master of Science in Conservation. Its aim is to give a limited number of qualified students with various backgrounds and vocational interests an understanding of the basic principles of natural and social science involved in conservation. Account will be taken of the fact that conservation is achieved by the use of many different vocational techniques. The students' aptitude, training, and interests will be considered in relation to possible careers in public service, education, business or other professions. Wide latitude in the choice of courses in the curriculum is provided, but all students are expected to take courses in ecology, the ecological basis of conservation, and a seminar in conservation.—GUSTAV A. SWANSON

THE IMPORTANCE OF SMALL MARSHES TO WATERFOWL

Mr. Albert M. Day, at the 15th North American Wildlife Conference in his first public comment on the results of the January waterfowl inventory said that "it looks now as though instead of gaining ground last year, we more than likely lost some of the previous years' gains and not only took the harvestable crop but also cut into the capital stock of this year's breeders." This statement rekindled at once the controversy in regards to duck numbers and the immediate response voiced in some regions was one of doubt and even of disrespect. It should be known by all that the January inventory is a joint effort carried out in a cooperative plan in Canada, in the United States, and in México, and that regional results are cleared through the separate administrative offices before being submitted to the Fish and Wildlife Service for final compilation. It is understandable that sportsmen of regions where winter concentrations have been heavy should adopt the optimistic viewpoint; and yet in the face of the final results it is as pointless for them to contest the complete analysis as it would be for a Republican state to contest an overall Democratic victory.

The waterfowl situation will not be secure until the optimists believe the evidence brought forth by these surveys, and until we are willing to let populations increase without immediate dividends in bag or season increases.

Mr. Day expressed concern regarding subsidized drainage, pointing to the heavy loss of breeding terrain resulting from this program. "Of real concern to all of us interested in waterfowl," he said, "is the accelerated pace agricultural drainage has assumed in recent years. The bulk of this is on privately-owned lands, but it is encouraged by government subsidies and guided by government soil conservation technicians. As a result, we are now losing essential breeding grounds and wintering habitats much faster than we are rebuilding them."

In large measure the drainage program goes ahead without a full understanding of its impact on breeding populations. There has developed in recent years a false belief that ducks are produced mainly on the large pristine marshes, and that small waters producing small numbers of ducks are relatively unimportant. The breeding-ground surveys of recent years have shown that the nesting populations of many of our important game ducks are spread thinly, even on the large marshlands. Agricultural lands may hold breeding numbers which in pairs per square mile closely approach or even exceed the breeding populations of the large, so-called "factory" marshes. Such agricultural breeding terrain covers a vastly greater area than the large, isolated marshlands, hence Mr. Day's statement that "the private landowners in this country hold the key to the bulk of the production of wildlife-waterfowl."

Mr. Day's approach to this drainage problem is fresh and encouraging. Most important, his research program is supplying the facts and figures which demonstrate the greater dollar value of the farm pothole in our national economy. Large marsh areas are vital to the welfare of our waterfowl, and great strides have been made in saving or restoring such waters. But the ultimate and the successful plan for waterfowl management cannot be established until we win administrative security for small waters on private lands.—ALBERT HOCHBAUM.

Announcement of Annual Meeting

Note: This is the official announcement of the annual meeting. No individual letters of announcement will be mailed but, as in the past, the completed program will be sent to members a short time in advance of the meeting.

Place and time. The Thirty-second Annual Meeting of the Wilson Ornithological Club will be held in Davenport, Iowa, Friday and Saturday, April 27–28, 1951. Headquarters will be the Davenport Public Museum, at 704 Brady Street. On Thursday evening, April 26, the Executive Council will meet. On Sunday, April 29, there will be organized field trips.

Davenport and how to reach it. Davenport, with a population of over 73,000, is on the Mississippi River 165 miles west of Chicago, 237 miles north of St. Louis, 331 miles south of St. Paul, and 177 miles east of Des Moines. It is on the main line of the Rock Island Railroad. The cities of Rock Island, Moline, and East Moline, just across the river in Illinois, join with Davenport in forming the Quad-Cities, a population area of over 200,000. The four cities, which are the center of the farm machine industry of the world, are connected by three bridges, those at either end being toll bridges, that in the middle a government 'free' drawbridge passing over Arsenal Island, the home of the Rock Island Arsenal. From this bridge there is an excellent view of the great roller dam and locks. Several city parks furnish good local birding. Credit Island Park, in the Mississippi, can be reached from the west part of Davenport. This park is highly recommended for birding unless flood waters happen to make it inaccessible. In April ducks, grebes, cormorants, herons and early migratory land birds are likely to be seen there.

The Davenport Public Museum. Registration, exhibits, and all sessions except the Annual Dinner will be at the Museum unless otherwise announced. The Museum was founded as the Davenport Academy of Science in 1867. Since 1877 it has been housed in the present central building. It contains outstanding collections representing local Indian cultures, Mississippi River history, and the civilizations of Japan, other oriental countries, and ancient Egypt. The collection of Peruvian pottery is notable. The natural science material is old but fairly representative. Among the mounted birds are many from the midwestern United States, Central America, and Japan. Once recognized internationally, the Museum has passed through a comparatively inactive period, but is now very much on the move. Its building program for the future is impressive.

Sessions. Sessions will begin at 9:00 A.M. and continue until about 5:00 P.M.

Special Events. There will be an exhibition of paintings by contemporary bird artists. It is hoped that all living American bird artists will be represented. Artists who wish to contribute should communicate, before January 1, with the Exhibit Committee, Davenport Public Museum, 704 Brady Street, Davenport, Iowa. It is to be hoped that members of the Wilson Club will see to it that all young and unknown artists have a place in this show.

Several artists are being asked to contribute original paintings and drawings of birds for an auction. These pictures will be offered at opening prices set by the artists. The difference between the opening prices and sale prices will go toward the *Wilson Bulletin* color-plate fund. Thus Club members will have an opportunity to acquire original paintings and at the same time to enhance the *Bulletin*.

An informal reception will be held in the Museum on Friday evening at 8 o'clock. Those attending may view the exhibit of bird art and meet the artists in attendance. Museum displays may also be inspected at this time, and guides will be provided.

The Annual Dinner will be held in the Gold Room of the Hotel Blackhawk at 7 o'clock Saturday evening. A short period of entertainment will precede the President's address.

Meeting of the Council. The Executive Council (all officers, all past presidents, and three elective members) will meet at the Museum on Thursday evening, April 26, at 7:30 o'clock. The Secretary requests that the Chairman of the several Committees send their written reports to him by April 15 so that these may be discussed by the Council.

Accommodations. All members are requested to write directly, to the hotel, and as soon as possible, for accommodations. Prices are:

	Single	*Double*
Hotel Blackhawk	$3.75 up	$5.25 up
Hotel Mississippi	4.00 up	6.00 up
Hotel Davenport	2.50 up	4.00 up
Hotel Dempsey	1.75 up	2.75 up
Hotel St. James	2.00 up	3.00 up

There are also numerous motels, tourist rooms and lower-priced hotels. The Local Committee will make every possible effort to arrange for suitable quarters of this sort. Write the Housing Committee, in care of the Museum, stating your desires. Special arrangements may be made for a limited number of students who write in advance.

Field Trips. The major attraction for bird students in the Mississippi Valley in late April is the migration of ducks and geese. Points of concentration for these waterfowl vary considerably with the season and final arrangements will be announced at the meeting. Trips will be provided to the best possible areas within a reasonable distance of Davenport. In late April of 1950 between five and ten thousand geese (Canada, Blue, Snow, and a few White-fronted and Hutchins's) could be seen near Savannah, Illinois, about forty miles north of the Quad-City area.

Hosts. Host organizations for this meeting are the Davenport Public Museum, the Tri-City Bird Club, and the Iowa Ornithologists' Union. The Local Com-

mittee in charge of Arrangements is as follows:

Chairman: Fred T. Hall, Davenport

Mr. and Mrs. Harry Carl, Davenport	Norwood Hazard, Davenport
Leo Doering, Rock Island	James Hodges, Davenport
Elton Fawks, Moline	Thomas J. Morrissey, Davenport
Rev. Thomas J. Feeney, Davenport	Mrs. Peter Peterson, Davenport
Miss Jeannette Graham, Davenport	Mrs. E. K. Putnam, Davenport
Miss Rose Guite, Rock Island	Richard E. Schaefer, Davenport
Mrs. Marian Hawes, Moline	Harold B. Yeaton, Davenport

Application for a Position on the Program

Members who have not yet published on their research, or who have motion pictures or slides of special interest, are urged to apply for a place on the program. Papers will be selected for their timely interest and their contribution to ornithology. In selecting papers, the Secretary will be assisted by the Local Committee and by other officers of the Club. Members who have nothing themselves to present may be able to suggest outstanding papers which the Secretary can secure for this meeting.

If you would like to appear on the program at Davenport, please write to the Secretary, Harold F. Mayfield, 2557 Portsmouth Avenue, Toledo 13, Ohio, not later than March 1, 1951. Please note that no more than one paper may be presented by any one member. A paper accompanied by motion pictures must not exceed 30 minutes. A paper accompanied by slides must not exceed 20 minutes. A paper without pictures must not exceed 15 minutes. A limited time for discussion will follow each paper.

In writing the Secretary, please supply *all* of the following information:

1. *Title of paper.* Give the title exactly as you want it to appear on the program.

2. *Abstract.* Prepare an abstract of your paper—brief, but sufficiently complete so that it may be used by the Local Committee for publicity and by the Secretary in preparing the meeting's proceedings.

3. *Time required.*

4. *Position.* State if it is essential that you appear at a particular time.

5. *Special equipment needed.* Blackboard, map hanger, pointer, etc.

6. *Motion pictures.* If your paper is to be illustrated with motion pictures give the following information: Size (16 mm. or 35 mm.). Color or black and white. Total footage. Number of reels. Size of reels.

7. *Slides.* If your paper is to be illustrated with slides, give the following information: Size ($3\frac{1}{4}''$ x $4''$, or $2''$ x $2''$). Color or black-and-white. Number of slides.

8. *Name.* Please write your name exactly as you wish it to appear on the program. Titles before names will not be used.

9. *Address.* Include the name of the institution with which you are asso-

ciated, if any. The name of this institution will appear after your name on the program.

THE WILSON ORNITHOLOGICAL CLUB

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Secretary ..... Harold Ford Mayfield
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MEMBERS

**Abbott, Cyril Edward, 651 E. First South, Apt. 8, Salt Lake City 3, Utah 1937
Abbott, Capt. Jackson Miles, The Engineer School, Fort Belvoir, Virginia 1948
Adalis, Miss Dorothy, 2121 Terrace Circle, Weirton, West Virginia 1950
*Adams, I. C. Jr., Box 158, Columbia, Missouri 1933
Addy, Charles Edward, 56 Spofford St., Newburyport, Massachusetts 1941
**Adelson, Richard Henry, 34 Wensley Drive, Great Neck, Long Island, New York .. 1938
**Afsprung, Arthur E., 3308 Bishop St., Cincinnati 20, Ohio 1948
**Aldrich, John Warren, Fish and Wildlife Service, Washington 25, D. C. 1930
*Alexander, Donald C[hild], 16 Pleasant St., Nahant, Massachusetts 1937
*Alexander, Gordon, Department of Biology, University of Colorado, Boulder, Colorado 1936
*Alexander, Maurice M[yron], Department of Forest Zoology, New York State College of Forestry, Syracuse 10, New York 1945
Alexander, R. C., 19207 Charleston Ave., Detroit 3, Michigan 1949
*Allen, A[rthur] A[ugustus], Fernow Hall, Ithaca, New York 1914
*Allen, Francis H[enry], 215 LaGrange St., West Roxbury 32, Massachusetts 1941
*Allen, Otis W., 504½ W. Market Street, Greenwood, Mississippi 1944
*Allen, Robert P[orter], Tavernier, Florida 1947
*Allin, Dr. A[lbert] E[llis], Provincial Laboratory, Fort William, Ontario, Canada .. 1943
Allyn, Dr. Paul Richard, 806 First National Bank Bldg., Springfield, Illinois 1944
*Alperin, Irwin M., 2835 Ocean Ave., Brooklyn 29, New York 1939
*Amadon, Dean, American Museum of Natural History, Central Park West at 79th St., New York 24, New York 1935
*Amidon, Mrs. Hilda F[arnum], 282 Sigourney, Hartford, Connecticut 1942
*Ammann, George Andrew, Game Division, Department of Conservation, Lansing 13, Michigan 1935
*Anderson, Anders H[arold], 3221 E. Kleindale Rd., Tucson, Arizona 1937
*Anderson, John M., 38 N. Madison St., Port Clinton, Ohio 1938
Anderson, Paul Knight, 126 W. River St., Orange, Massachusetts 1947
*Anderson, R[udolph] M[artin], National Museum of Canada, Ottawa, Ontario ... 1937
Anderson, William Deans, 3100 Beverly Rd., Austin 21, Texas 1950
*Andrews, James Clinton, 1 East York St., Nantucket, Massachusetts 1947
Ansaldi, Mrs. Fay Haverstock, 1380 Penobscot Bldg., Detroit 26, Michigan 1949
Anthes, Clarence A[lvin], 713 Hamilton Ave., Waukesha, Wisconsin 1939
Anthony, Jesse D., 722 1st Ave. E., Grand Rapids, Minnesota 1944
Appel, Thomas G., 63 Sunnyside Ave., Pleasantville 2, New York 1950
Appleton, J[ohn] S[parhawk], Simi, California 1936
*Arbib, Robert S[imeon] Jr., 231 West Lena Ave., Freeport, New York 1947
Armington, Sven, Blanchegatan 18, Stockholm, Sweden 1948
Armitt, Herbert T., 102 Orange Ave., East Paterson, New Jersey 1950
**Armstrong, Miss Virginia, Musketaquid Road, Concord, Massachusetts 1939
Arnett, John Hancock Jr., 6200 Ardleigh St., Philadelphia 38, Pennsylvania 1944
*Arnold, Elting, 514 Dorset Ave., Chevy Chase 15, Maryland 1941
Arnold, Rev. Jay [Hartzell], 20 N. Pine St., York, Pennsylvania 1945
Arny, Samuel A., 1435 Octavia St., New Orleans 15, Louisiana 1947

****—Honorary Member. ***—Life Member. **—Sustaining Member. *—Active Member. Others—Associate Members.

Aronoff, Arthur Edward, 59 W. 71 St., New York 23, New York 1948
*Arvey, M[artin] Dale, Dept. of Zoological Sciences, Univ. of Oklahoma, Norman, Oklahoma 1949
*Ashton, Randolph, 800 Crown St., Morrisville, Pennsylvania 1941
*Austin, Mrs. Harold C., 1116 Mandana Rd., Oakland 10, California 1950
*Austin, John Brander, 9 Chamonix Rd., St. Davids, Pennsylvania 1947
*Austin, Dr. Oliver L[uther], Post Office Box 236, Tuckahoe, New York 1930
Autry, Homer V. Jr., Post Office Box 1915, Charlotte, North Carolina 1949
*Axtell, Harold H., Buffalo Museum of Science, Humboldt Park, Buffalo 11, New York 1950
Ayer, Mrs. N[athan] Edward, 1300 Hillcrest Drive, Pomona, California 1936
**Aylward, David A., 20 Spruce St., Boston 8, Massachusetts 1945
Bacon, Brasher Collins Sr., Spring Lake Wildlife Sanctuary, Chickadee Hill, Madisonville, Kentucky 1948
Baechle, Rev. John W[illard], St. Joseph's College, Collegeville, Indiana 1943
Baer, Miss Myrtle W., 1237 N. Jefferson St., Milwaukee 2, Wisconsin 1941
***Bagg, Aaron Moore, 72 Fairfield Ave., Holyoke, Massachusetts 1948
*Bailey, Alfred Marshall, Denver Museum of Natural History, City Park, Denver 6, Colorado 1928
**Bailey, Harold H[arris], Rockbridge Alum Springs Biological Laboratory, Route 2, Goshen, Virginia 1908
Bailey, Mrs. H. M., 1020 Jones St., Apt. 4, Sioux City 18, Iowa 1918
Bailey, Robert A[lexander], Sarona, Wisconsin 1947
Bailey, Rolfe Wayne, 520 Second Ave., South Charleston, West Virginia 1946
***Baker, Bernard W., Route No. 1, Judson Road, Spring Lake, Michigan 1938
*Baker, John H[opkinson], 1165 Fifth Ave., New York, New York 1930
**Baker, Louis Stannard, 9 Washington Rd., Parlin, New Jersey 1949
*Baker, Maurice F[rank], Museum of Natural History, University of Kansas, Lawrence, Kansas 1947
*Baker, Paul S[eaman], 5545 Stonegate Dr., Dallas 9, Texas 1946
*Baker, Rollin Harold, Museum of Natural History, University of Kansas, Lawrence, Kansas 1938
*Baker, William C[alvin], 559 Euclid St., Salem, Ohio 1931
Baldwin, Mrs. Amy G., 6335 Kimbark Ave., Apt. B., Chicago 37, Illinois 1943
*Ball, Kathleen E., 240 Central Ave., London, Ontario, Canada 1946
Ball, William Howard, 5818 30th Ave., Hyattsville, Maryland 1924
*Balsom, Mrs. Amos Parker, 2209 E. Stratford Court, Milwaukee 11, Wisconsin 1949
*Bancroft, Miss Constance J[ordan], Indian Mountain School, Lakeville, Connecticut 1947
*Banks, Clinton S[eeger], 202 Wilma Ave., Steubenville, Ohio 1945
Banta, Miss Edna, Route 6, Connersville, Indiana 1945
*Barber, Bertram A[lpha], Department of Biology, Hillsdale College, Hillsdale, Michigan 1945
*Barber, Miss Lucy, Box 6092 Station A., Charleston 2, West Virginia 1950
*Barber, Miss Sarah C., Box 6092 Station A., Charleston 2, West Virginia 1950
*Barbig, Howard T., Route 10, Box 424, Ivanhoe Rd., Memphis, Tennessee 1949
*Barbour, Llewellyn P[helps], 94 Wood St., Willoughby, Ohio 1948
*Bard, Fred George, Provincial Museum, Normal School, Regina, Saskatchewan, Canada 1946
Barkalow, Frederick Scheck Jr., Box 5215, State College Station, Raleigh, North Carolina 1936

Barnes, Charles K[napp], 2026 L.W.W., South Bend 19, Indiana. 1949
Barnes, William Bryan, 311 W. Washington St., Indianapolis 9, Indiana. 1941
Barnes, W. Hughes, 12 N. College St., New Concord, Ohio. 1946
Barnickol, Mrs. Kathleen Marie, 3530 Washington Blvd., Indianapolis 5, Indiana. . 1948
**Barrett, J. P., 921 E. Central Ave., Ponca City, Oklahoma. 1950
Barrett, Lewis Le Roy, 1930 Lincoln St., N.E., Minneapolis, Minnesota. 1949
*Bartel, Karl E[mil] Edgar, 2528 West Collins St., Blue Island, Illinois. 1934
*Bartlett, Guy, 1053 Parkwood Blvd., Schenectady 8, New York. 1938
*Bartlett, Wesley H., 122 South Ridgley, Algona, Iowa. 1936
*Bartsch, Paul, Gunston Hall Rd., Lorton, Virginia. 1894
*Batchelder, Charles Foster, 7 Kirkland St., Cambridge, Massachusetts. 1927
*Batchelder, Edgar M[arden], 56 Orchard St., Marblehead, Massachusetts. 1941
***Batts, H[enry] Lewis Jr., 1211 Glenwood Ave., Kalamazoo, Michigan. 1946
Bauers, Harold A[ugust], 2321 N. 32nd St., Milwaukee 10, Wisconsin. 1947
Baumgartner, Milton D[aniel], 154 Kings Highway, Stillwater, Oklahoma. 1944
**Baxter, William Jr., 27 Virginia Ave., Rehoboth Beach, Delaware. 1945
*Beach, Pearle Leenhouts (Mrs. Walter H.), 328 Parsells Ave., Rochester 9, New York. 1941
*Beacham, Edward Derek, 238 Wineva Ave., Toronto 8, Ontario, Canada. 1950
Beal, John Lawrence, 408–410 E. Franklin Ave., Gastonia, North Carolina. 1949
Beard, Elizabeth Browne (Mrs. Allen Shelby), 9904 Berwick Rd., Rosedale Gardens, Plymouth, Michigan. 1942
Beardslee, Clark Smith, 132 McKinley Ave., Kenmore 17, New York. 1942
Beardsley, Miss M[argaret] Hortense, 410 S. Prospect St., Ravenna, Ohio. 1941
Beck, Rollo Howard, Planada, California. 1943
Becker, Mrs. Paul A., 251 E. Phelps, Owatonna, Minnesota. 1944
Bedell, Miss Marie L., 1430 W. 20th St., Lorain, Ohio. 1940
*Beebe, Ralph, 4169 Tenth St., Ecorse 29, Michigan. 1924
*Beebe, William, 33 West 67th St., New York, New York. 1944
*Beecher, William J[ohn], Chicago Natural History Museum, Chicago 5, Illinois. . . . 1948
Beemer, Mrs. Eleanor V[irginia], Pauma Valley, Pala, California. 1948
Behle, William H[arroun], Department of Biology, University of Utah, Salt Lake City, Utah. 1935
*Behrend, Fred W[illiam], 322 Carter Blvd., Elizabethton, Tennessee. 1944
Behrens, Harry Carl, 627½ 8th St., Rapid City, South Dakota. 1950
**Belcher, Paul Eugene, 988 Jefferson Ave., Apt. 3, Akron, Ohio. 1938
*Bell, Henry III, United States Geological Survey, Box 360, Grand Junction, Colorado. 1946
*Bellrose, Frank Jr., Illinois Natural History Survey, Havana, Illinois. 1935
Bennett, Holly Reed, 2457 Orchard St., Chicago 14, Illinois. 1949
*Bennett, Miss Mary A[llison], 623 E. Carroll St., Macomb, Illinois. 1933
*Benson, Mrs. Mary Heydweiller, 183 Cherry Rd., Rochester 12, New York. 1937
Benson, Seth Bertram, 645 Coventry Rd., Berkeley 7, California. 1930
*Bent, Arthur C[leveland], 140 High St., Taunton, Massachusetts. 1893
Berger, Andrew J[ohn], Department of Anatomy, East Medical Building, Ann Arbor, Michigan. 1940
Berger, Dan, 5026 N. Elkhart Ave., Milwaukee 11, Wisconsin. 1950
Bergstrom, E[dward] Alexander, 37 Old Brook Rd., West Hartford 7, Connecticut. . 1943
*Berkowitz, Albert Clarence, 1912 Grand Ave., Tension Envelope Corp., Des Moines 14, Iowa. 1946
Berlin, Grace [Fern] (Mrs. Herbert), R.F.D. No. 1, Monclova, Ohio. 1946

Beule, John D[avid], 312 W. 3rd St., Beaver Dam, Wisconsin. 1948
*Biaggi, Virgilio Jr., College of Agriculture, Mayagüez, Puerto Rico. 1945
*Biggs, Joseph Daniel, 6624 First St., N. W., Washington 12, D. C. 1949
Bilby, H[enry] A[nthony], 2 Sunnyside Cottages, Harlington, Middlesex, England. . 1947
Birch, Robert Lee, Department of Biology, West Virginia University, Morgantown, West Virginia 1950
*Bird, Dick, 34 QuAppelle Apts., Regina, Saskatchewan, Canada. 1949
Bissonnette, T[homas] Hume, Trinity College, Hartford 6, Connecticut. 1939
Black, Charles Theodore, Rose Lake Wildlife Experimental Station, Route 1, East Lansing, Michigan 1935
***Blain, Alexander W[illis], 2201 Jefferson Ave. East, Detroit 7, Michigan. 1902
*Blake Charles H[enry], Woodland Way, Lincoln, Massachusetts. 1950
*Blake, Emmet R[eid], Chicago Natural History Museum, Chicago 5, Illinois. . . . 1939
*Blake, Grace R. (Mrs. Henry Seavey), 1933 Westwood Drive, Topeka, Kansas. . . . 1950
Blanchard, Harold H[ooper], 32 Calumet Rd., Winchester, Massachusetts. 1946
Blazer, Warren G., 31 Conant Hall, Harvard University, Cambridge 38, Massachusetts 1949
**Bleitz, Donald Lewis, 5338 Hollywood Blvd., Hollywood 27, California. 1948
*Blincoe, Ben[edict] Joseph, 8766 N. Main St., Dayton 5, Ohio. 1919
Blincoe, Edith J. (Mrs. Benedict J.), 8766 N. Main St., Dayton 5, Ohio. 1926
**Blossom, Philip M[oss], 2422 E. Washington St., Pasadena, California. 1949
Boblitt, Mrs. Vella, 403 N. 3rd St., Bardstown, Kentucky. 1950
Bodmer, Olive A. (Mrs. Herbert A.), Box 14, Kenmare, North Dakota. 1950
*Boggs, Ira Brooks, West Virginia University, Morgantown, West Virginia. 1938
Boldt, Wilbur, 214 East Seventh St., Ames, Iowa. 1949
**Bond, James, 1900 Race St., Philadelphia 3, Pennsylvania. 1945
*Bond, Richard M[arshall], 3322 SW Fairmount Blvd., Portland 1, Oregon. 1936
*Booth, Mrs. Robert V. D., RFD No. 3, Johnnycake Ridge, Painesville, Ohio. . . . 1949
*Borden, Richard, 1031 Canton Ave., Milton, Massachusetts. 1947
*Borell, Adrey Edwin, Soil Conservation Service, Box 1348, Albuquerque, New Mexico 1936
*Borror, Donald J[oyce], Department Zoology and Entomology, Ohio State University, Columbus 10, Ohio 1927
**Boulton, Rudyerd, 3317 Dent Place N.W., Washington 7, D. C. 1942
*Bourne, Raymond D[ory], 118 East Vine St., Oxford, Ohio. 1946
Bowdish, Beecher S[coville], Demarest, New Jersey. 1921
Bowen, Robert Marvin, 5009 Leeds Ave., Halethorpe 27, Maryland. 1947
Bowers, J. Basil, 381 51st St., Oakland 9, California. 1942
Bowman, Robert I[rvin], International House, University of California, Berkeley 4, California 1948
Boyd, Miss Elizabeth M[argaret], Mount Holyoke College, South Hadley, Massachusetts 1941
Boyd, Hugh J., 24 Bedminster Rd., Bristol 3, England. 1946
*Boyer, George Frederick, RFD 1, West Sackville, New Brunswick, Canada. . . . 1949
**Brackbill, Hervey [Groff], 4608 Springdale Ave., Baltimore 7, Maryland. 1942
Bradburn, Donald Muir, 461 Pine St., New Orleans 18, Louisiana. 1950
***Bradley, Miss Hazel L[ouise], 908 W. Michigan Ave., Jackson, Michigan. 1944
Bradley, Homer L., Long Lake Refuge, Moffitt, North Dakota. 1939
***Brandt, Herbert W., 2245 Harcourt Dr., Cleveland 6, Ohio. 1945
*Branum, Miss Florence [Pauline], 117 N. Ewing St., Lancaster, Ohio. 1946
Brauner, Joseph, 10817 Strathmore Dr., Los Angeles 24, California. 1942

***Brecher, Leonard C[harles], 1900 Spring Dr., Louisville 5, Kentucky. 1939
Brecht, Miss Grace Elizabeth, 1328 Clinton Ave., Irvington 11, New Jersey. 1949
**Breckenridge, Walter J[ohn], Museum of Natural History, University of Minnesota, Minneapolis 14, Minnesota 1929
Breiding, George H[erbert], 487 National Rd., Fulton, Wheeling, West Virginia. . 1942
**Brewer, Richard Dean, 1506 Edith St., Murphysboro, Illinois. 1949
*Brigham, Edward M[orris] Jr., Kingman Memorial Museum, Battle Creek, Michigan 1931
Brigham, Edward M[orris] III, Route 5, Box 19, Battle Creek, Michigan. 1950
*Brigham, H[erbert] Storrs Jr., 3817 Sedgwick Ave., New York 63, New York. . . . 1942
Bristow, Harry Sherman Jr., Pine Ave., Cedars, Marshallton, Delaware. 1942
Broadbooks, Harold E[ugene], Department of Zoology, University of Arizona, Tucson, Arizona 1950
Brockschlager, Miss Mary Elizabeth, 518 E. Fourth St., Cincinnati 2, Ohio. 1948
*Brokaw, De Witt P., 176 Rockview Ave., Plainfield, New Jersey. 1948
Broley, Charles L[avelle], Delta, Ontario. 1946
Brooks, Mrs. Benjamin Talbot, 119 Lindalou Drive, San Antonio 10, Texas. . . . 1945
*Brooks, Earle A[mos], 166 Plymouth Rd., Newton Highlands, Massachusetts. . . . 1933
***Brooks, Maurice Graham, Division of Forestry, Morgantown, West Virginia. . . . 1927
*Broun, Maurice, Route 2, Kempton, Pennsylvania. 1935
Brown, Clarence D., 222 Valley Rd., Montclair, New Jersey. 1938
Brown, E[lmer] E[vans], Davidson College, Davidson, North Carolina. 1945
*Brown, N[orman] Rae, Faculty of Forestry, University of New Brunswick, Fredericton, New Brunswick, Canada 1945
*Brown, Woodward H[art], 4815 Ingersoll Ave., Des Moines 12, Iowa. 1949
Brownsey, Mrs. Edgar George, 2911 San Isidro St., Tampa 9, Florida. 1946
Brueggemann, Miss Anna L[ouise], 584 Sheridan Ave., Columbus 9, Ohio. 1943
***Bruns, James Henry, 1820 Jefferson Ave., New Orleans, Louisiana. 1941
Bryan, Dr. Burton Donald, 162 French St., Fall River, Massachusetts. 1949
**Bryens, Oscar McKinley, 231 S. Main St., Three Rivers, Michigan. 1924
Buchanan, Forest Wendell, Amsterdam, Ohio. 1939
*Bucheister, Carl W., 1006 Fifth Ave., New York 28, New York. 1943
*Buckland, George, Route 1, Batavia, New York. 1949
*Buckstaff, Ralph Noyes, Oshkosh Public Museum, Oshkosh, Wisconsin. 1941
*Bures, Joseph August, Route 1, West Newton, Pennsylvania. 1946
*Burget, Russel Lincoln, Route 2, Perrysburg, Ohio. 1944
Burgin, Miss Muriel Beverly, 7 Upland Ave., Barre, Vermont. 1950
Burkhart, Mrs. Harriet H., Box 166, Old Valley Road, Union City, Pennsylvania. . 1949
*Burleigh, Thomas Dearborn, School of Forestry, University of Idaho, Moscow, Idaho 1922
*Burland, Lee J[ohnson], Snook Apts., Castleton-on-Hudson, New York. 1939
*Burlingame, Virginia S[truble] (Mrs. M. G.), 812 S. 8th St., Bozeman, Montana. . 1946
*Burner, Miss Florence H[elen], 5350 Reisterstown Rd., Baltimore 15, Maryland. . 1948
Burnett, Miss Frances L., Fernow Hall, Ithaca, New York. 1950
*Burns, Maurice E[dward], 735 W. 10th St., Escondido, California. 1948
Burns, Robert David, 1805 Greenleaf Dr., Royal Oak, Michigan. 1948
*Burr, Irving W[ingate], 265 Littleton St., West Lafayette, Indiana. 1945
Burr, Malcolm F., Barberry Hill Farm, Bethlehem, Connecticut. 1950
*Burt, William Henry, Museum of Zoology, University of Michigan, Ann Arbor, Michigan. 1928
*Bushwitz, Henry William, 2218 S. Baker St., Santa Ana, California. 1950

*Butchart, Mrs. G. Reeves, Museum of Zoology, University of Michigan, Ann Arbor, Michigan 1943
Butler, Thomas Sheridan, 708 N. Poplar St., Paris, Tennessee 1949
*Butsch, Robert Stearns, Museum of Zoology, University of Michigan, Ann Arbor, Michigan 1947
Bytzko, Miss Anne, 13563 Arlington, Detroit 12, Michigan 1948
Cade, Tom, Box 626, College, Alaska 1950
Cagle, Fred R., Department of Zoology, Tulane University, New Orleans, Louisiana 1942
*Cahalane, Victor H[arrison], National Park Service, Washington 25, D. C. 1933
Caldwell, Miss Sara E[lizabeth], 193 Carpenter Rd., Mansfield, Ohio 1946
Calhoun, John B[umpass], Hamilton Behavior Station, Box 78, Bar Harbor, Maine 1949
Calvert, Earl Wellington, R.R. 2, County Home, Lindsay, Ontario, Canada 1937
Calvert, William J[onathan] Jr., 615 N. Pelham Rd., Jacksonville, Alabama 1942
Camburn, F. Lawrence, Edwin S. George Reserve, Pinckney, Michigan 1947
Campbell, Esther W. (Mrs. W. V.), 421 N. 9th St., Oskaloosa, Iowa 1950
Campbell, John David, 1222 W. State St., Geneva, Illinois 1944
Campbell, [John] Howard, 512 N. Vermont St., Albuquerque, New Mexico 1949
*Campbell, Louis W[alter], 4531 Walker Ave., Toledo 12, Ohio 1926
*Campbell, Miss Mildred F[lorence], 29 N. Hawthorne Lane, Indianapolis 19, Indiana 1938
Carl, Harry G., 2304 Davie St., Davenport, Iowa 1949
Carlander, Kenneth Dixon, Department of Zoology, Iowa State College, Ames, Iowa 1948
**Carnes, Mrs. Herbert E., 25 Kenwood Rd., Tenafly, New Jersey 1944
*Carpenter, Floyd S., 2402 Longest Ave., Louisville 4, Kentucky 1934
Carpenter, Forrest A[lmon], 7345 Bryant Ave. S., Minneapolis 19, Minnesota 1948
*Carpenter, Thomas L., 557 N. 68th St., Milwaukee 13, Wisconsin 1948
*Carroll, Col. Robert P., 305 Letcher Ave., Lexington, Virginia 1942
Carroll, William Baxter, Box 432, Siler City, North Carolina 1949
***Carrothers, Miss Verna, 14704 Alder Ave., East Cleveland 12, Ohio 1938
Carson, L[enwood] B[allard], 1306 Lincoln St., Topeka, Kansas 1948
*Carter, Dennis [Lee], Box 84, Thor, Iowa 1947
Carter, Bertha May (Mrs. E. W.), Route 4, Bowling Green, Ohio 1946
Carter, T. C., Northwestern State College, Alva, Oklahoma 1947
*Cartwright, Bertram William, 201 Bank of Commerce Bldg., Winnipeg, Manitoba, Canada 1930
*Cassel, J[oseph] Frank[lin], Department of Zoology, North Dakota Agriculture College, Fargo, North Dakota 1940
**Castellano, Leonard, 288 Hollywood Ave., Yonkers, New York 1950
*Castenholz, Richard William, 431 S. East Ave., Oak Park, Illinois 1949
*Cater, Milam B[rison], Box 133, Millboro, Virginia 1944
***Cavendish, Miss Virginia G., 1661 Sixth Ave., Huntington, West Virginia 1946
**Chalif, Edward Louis, 37 Barnsdale Rd., Short Hills, New Jersey 1947
*Challey, John [Raymond], 1349 2nd St. N., Fargo, North Dakota 1948
Chambers, Miss Amy C., 2905 Irving S., Minneapolis 8, Minnesota 1950
**Chambers, W. Lee, Robinson Rd., Topanga, California 1909
Chance, Edgar P[ercival], Ambarrow Wood, Sandhurst, Berkshire, England 1941
*Chapin, James P[aul], American Museum of Natural History, 79th St. & Central Park W., New York 24, New York 1945

**Chapin, John L[adner], Louisiana State University Medical School, New Orleans, Louisiana ... 1947
*Chapman, Floyd B[arton], 392 Walhalla Rd., Columbus 2, Ohio ... 1932
*Chapman, Herman Floraine, 712 South Dakota Ave., Sioux Falls, South Dakota ... 1947
Chapman, Lawrence B., 1 Woodridge Rd., Wellesley 81, Massachusetts ... 1940
Chapman, Mrs. Naomi Fran, Box 177, Flossmoor, Illinois ... 1945
*Chase, Henry B. Jr., 517 Decatur St., New Orleans 16, Louisiana ... 1932
Chatham, Comdr. Thurman, 112 Stratford Rd., Winston-Salem, North Carolina ... 1945
Chiavetta, Kenneth James, Conservation Commission, United States Department of Agriculture Bldg., Elkins, West Virginia ... 1948
*Childs, Henry E[verett] Jr., Museum of Vertebrate Zoology, Berkeley 4, California ... 1948
**Church, C[harles] T[homas], 70 Pine St., New York 5, New York ... 1945
*Chutter, Miss Mildred C., Box 229, Athens, Ohio ... 1936
Clark, Miss Martha L., Box 1176, Danville, Virginia ... 1949
***Clarkson, Mrs. Edwin O., 248 Ridgewood Ave., Wing Haven, Charlotte 7, North Carolina ... 1940
Clausen, Arthur William, 120 W. Main Street, Dwight, Illinois ... 1947
*Clay, William M[arion], Department of Biology, University of Louisville, Louisville 8, Kentucky ... 1947
Clemens, William B[ryson], 5½ Duane St., Cortland, New York ... 1942
*Clement, Roland C[harles], Box 31, Providence 1, Rhode Island ... 1941
Clements, H[iram] Everest, 49 Stoneham Rd., Rochester 10, New York ... 1949
*Clow, Miss Marion, Box 163, Lake Forest, Illinois ... 1929
*Cobb, Augustus S., 7403 Emlen St., Philadelphia 19, Pennsylvania ... 1949
*Cobb, Boughton, 25 East End Ave., New York, New York ... 1949
*Coffey, Ben Barry Jr., 672 N. Belvedere, Memphis 7, Tennessee ... 1927
*Cogswell, Howard L[yman], Museum of Vertebrate Zoology, University of California, Berkeley 4, California ... 1944
Cole, Richard D., Hillen Rd., Towson 4, Maryland ... 1949
Collias, Nicholas E[lias], Department of Zoology, University of Wisconsin, Madison 6, Wisconsin ... 1945
*Collins, Mrs. Edna, 1123 N. Hawthorne Lane, Indianapolis, Indiana ... 1948
Collum, Charles Edward, 1070 Lucile Ave., S.W., Atlanta, Georgia ... 1947
Collum, Thomas Francis, 1070 Lucile Ave., S.W., Atlanta, Georgia ... 1947
Comfort, James F., 27 N. Iola Drive, Webster Groves 19, Missouri ... 1947
Compton, Miss Dorothy M[ay], 22 Wilton St., Princeton, New Jersey ... 1945
*Compton, Lawrence Verlyn, Soil Conservation Service, Box 1898, Ft. Worth, Texas ... 1923
*Congdon, R[ussel] T[hompson], Medical Arts Building, Wenatchee, Washington ... 1944
Conkey, John H., 11 Chestnut Street, Ware, Massachusetts ... 1947
Conn, Robert Carland, 769 Park Ave., Bound Brook, New Jersey ... 1945
*Conrad, Charles L[ouis], 1206 Warwood Ave., Wheeling, West Virginia ... 1937
*Conway, Albert E., Department of Psychology, Lafayette College, Easton, Pennsylvania ... 1939
*Cook, Bill J[ames], 969 Congress Ave., Glendale, Ohio ... 1948
*Cook, Miss Fannye Adine, State Fish and Game Commission, 2550 N. State St., Jackson 44, Mississippi ... 1923
**Cool, Leon D. Jr., RFD 2, Rockville, Maryland ... 1950
Coombes, Robert Armitage Hamilton, The Zoological Museum, Tring, Hartfordshire, England ... 1936

Cope, James B[onwill], Earlham College, Richmond, Indiana 1949
*Cottam, Clarence, Fish and Wildlife Service, Department of the Interior, Washington 25, D. C. 1929
Cottrell, George William Jr., 70 Lake View Ave., Cambridge 38, Massachusetts .. 1941
**Cottrille, Betty Darling (Mrs. W. P.), 6075 Brown's Lake Road, Jackson, Michigan 1950
*Cottrille, Dr. W[illiam] Powell, 408–411 Reynolds Bldg., Jackson, Michigan 1949
Court, Edward J., 1723 Newton St., N.W., Mount Pleasant, Washington, D. C. .. 1944
Craighead, John J., Jackson, Wyoming 1950
*Crawford, Alan Jr., White Horse Road, Devon, Pennsylvania 1949
**Creager, Joe C[lyde], L. A. Cann Rd., Drawer 1267, Ponca City, Oklahoma 1947
Crewson, Ray[mond] [Charles], 111 East Texas Ave., Sebring, Ohio 1947
Crichton, Vincent, Chapleau, Ontario, Canada 1948
*Crone, Miss Mary C., 6602 1st St., N. W., Washington 12, D. C. 1949
Crooks, Malcolm P., Apt. 3, 1134 Lee St., Charleston, West Virginia 1950
Cross, Frank C., 9413 Second Ave., Silver Spring, Maryland 1949
Crowder, Orville W[right], Chase, Maryland 1946
*Cruickshank, Allan Dudley, Highland Hall, Rye, New York 1939
Cruttenden, John Rudy, 2020 Main St., Quincy, Illinois 1945
Cumming, Fairman Preston, 824 Sutton Hill Rd., Nashville 4, Tennessee 1950
*Cunningham, Frederick Arthur, Foxholm, North Dakota 1950
*Cunningham, James W., 3009 E. 19th Terrace, Kansas City 1, Missouri 1935
*Cunningham, Miss Nance M., 3600 Mandell, Houston 6, Texas 1950
*Cunningham, Tinsley Halter, Route 2, Seven Locks Rd., Rockville, Maryland 1950
Curtis, Miss Elizabeth L[ong], 5648 Beach Drive, Seattle 6, Washington 1935
Curtis, Mrs. Vee Kaelin, 1450 Bancroft Way, Berkeley 2, California 1950
*Dambach, Charles A., Ohio Division of Wildlife, State Office Bldg., Columbus 15, Ohio 1934
Damon, David, Box 10188 Oaks Branch, Fort Worth, Texas 1933
*Dana, Edward Fox, 57 Exchange St., Portland 3, Maine 1939
**D'Angelo, Angelo [Ralph], 809 Palisade Ave., Union City, New Jersey 1949
Daniels, Ben S[weet], 78 Wood St., Willoughby, Ohio 1949
Daniels, George Goetz, 74 Phillips St., Boston, Massachusetts 1949
Darby, Richard T[horn], 5046 Chancellor St., Philadelphia 39, Pennsylvania 1948
**Darden, Mrs. Colgate W[hitehead] Jr., University of Virginia, Charlottesville, Virginia 1943
Dater, Eleanor E. (Mrs. John Y. Jr.), 259 Grove St., Ramsey, New Jersey 1949
Davey, Dr. Winthrop N[ewbury], University Hospital, Ann Arbor, Michigan 1941
*Davidson, Miss Sarah A., 344 Summit Ave., St. Paul 2, Minnesota 1949
**Davidson, William Mark, 1504 Bodell St., Orlando, Florida 1933
*Davis, Clifford Vernon, Department of Zoology and Entomology, Montana State College, Bozeman, Montana 1945
*Davis, Dr. David E[dward], School of Hygiene and Public Health, Johns Hopkins University, Baltimore 5, Maryland 1940
Davis, George W., 148 Northfield St., Montpelier, Vermont 1941
Davis, Howard Henry, Little Stoke, Patchway, Bristol, England 1947
*Davis, John, 1420 East Mountain St., Pasadena, California 1939
*Davis, L[ouis] Irby, Box 988, Harlingen, Texas 1933
Davis, Mrs. N. H., Plainfield, Vermont 1950
*Davis, Russell S., Clayton, Illinois 1947
Davis, W[illiam] B., Department of Wildlife Management, College Station, Texas .. 1938

Davis, William Franklin, 423 W. 46th St., Ashtabula, Ohio. 1947
*Davisson, A. Paul, 1112 Fleming Ave., Fairmont, West Virginia. 1947
Dawn, Walter H[enry], 1143 Rogers Ave., Brooklyn 26, New York. 1945
Dawson, Richard G[len], 6114 Indiana Ave., Kansas City 4, Missouri. 1949
*Dean, Mrs. Blanche Evans, 1503 Ridge Rd., Homewood, Birmingham 9, Alabama 1947
*Dear, Lt. Col. L[ionel] S[extus], Box 127, Port Arthur, Ontario, Canada. 1939
Dechen, Mrs. Lillian Orvetta, 14 Summer St., Port Dickinson, Binghamton 6, New York. 1939
*Decker, C[harles] O., 6450 Kenwood Ave., Chicago 37, Illinois. 1938
*Deevey, Edward S[mith] Jr., Osborn Zoological Laboratory, Yale University, New Haven 11, Connecticut. 1948
*DeGarmo, William Russell, Darby Apt. No. 5, 10th St., Elkins, West Virginia. . . . 1946
*DeGroot, Dudley Sargent, West Virginia University, Morgantown, West Virginia. 1948
Dehner, Rev. Eugene W[illiam], St. Benedict's College, Atchison, Kansas. 1944
***Delacour, Jean Theodore, American Museum of Natural History, Central Pk. West at 79th St., New York 24, New York. 1944
Delaney, Joyce Marie, 471 Allard Rd., Gross Pointe Farms, Michigan. 1950
Delavan, Wayne G., Route 2, Box 61, Bronson, Kansas. 1943
*DeLime, John L., 101 No. 16th St., Murray, Kentucky. 1949
*DeLury, Ralph Emerson, 330 Fairmont Ave., Ottawa, Ontario, Canada. 1920
*Denham, Reginald [Francis], 100 Central Park South, New York 19, New York. . 1948
Denman, Clayton Charlton, 1751 Naomi Place, Seattle 5, Washington. 1949
*Denton, J[ames] Fred Jr., 1510 Pendleton Rd., Augusta, Georgia. 1935
Derby, James Vaughn Jr., 2704 Emmett Rd., Silver Spring, Maryland. 1950
**de Schauensee, Rodolphe Meyer, Devon, Pennsylvania. 1945
***Desmond, Hon. Thomas C[harles], Box 670, Newburgh, New York. 1942
*Deusing, Murl, Milwaukee Public Museum, Milwaukee 3, Wisconsin. 1937
Devitt, Otto Edmund, 68 Donegall Drive, Toronto 17, Canada. 1935
Dice, Lee R[aymond], Laboratory of Vertebrate Biology, 1135 E. Catherine St., Ann Arbor, Michigan. 1943
Dick, John Henry, Dixie Plantation, Meggett, South Carolina. 1949
Dickinson, J[oshua] C[lifton] Jr., Department of Biology, University of Florida, Gainesville, Florida. 1939
*Dickinson, Miriam S. (Mrs. William Winston), 2006 Reid Ave., Bluefield, West Virginia. 1942
Diesselhorst, G[erd] [Felix], Emmering Hauptstrasse 32, Fürstenfeldbruck bei München, Bayern, Germany, American Zone. 1949
Dietrich, Otto Killian, 225 Glendora Ave., Louisville 12, Kentucky. 1947
Dill, Herbert H., United States Fish and Wildlife Service, Sumner, Missouri. 1950
*Dingle, Edward von Siebold, Huger, South Carolina. 1921
*Dittemore, Lester P., 1207 Byron Ave., Topeka, Kansas. 1950
*Dixon, Miss Clara, Albion College, Albion, Michigan. 1947
*Dixon, J[ames] B[enjamin], RFD 1, Box 688, Escondido, California. 1936
Dixon, Keith Lee, Museum of Vertebrate Zoology, Berkeley 4, California. 1946
**Dodge, Victor K[enney], 137 Bell Court West, Lexington 23, Kentucky. 1935
Doerhoefer, Basil, Upper River Rd., Route 1, Louisville, Kentucky. 1947
**Doering, Hubert R., 485 Clemens Ave., Kirkwood 22, Missouri. 1945
Domm, Lincoln V[alentine], Department of Anatomy, University of Chicago, Chicago 37, Illinois. 1936

*Donahoe, Dr. John D., 335 N. Summit Ave., Sioux Falls, South Dakota 1949
Dorney, Robert Starbird, Box D, Horicon, Wisconsin 1949
*Douglass, Donald W., Game Division, Michigan Department of Conservation, Lansing 13, Michigan 1929
Dowling, Paul Bruce, 257 E. Beaver Ave., State College, Pennsylvania 1950
Drechsler, H[oward] A., 1008 Pleasant St., Oak Park, Illinois 1949
*Drum, Miss Margaret, 217 South St., Owatonna, Minnesota 1937
*Dudley, John M[urchie], 20 Germain St., Calais, Maine 1944
Duffield, Marjorie O[lney] (Mrs. John W.), Institute of Forest Genetics, Placerville, California 1948
*Duffy, John Joseph Jr., 1067 S. Campbell St., Springfield, Missouri 1950
Duflot, Miss Helen [Louise], 320 East 61 St., New York 21, New York 1949
Dugan, Caldwell Norton, 446 14th Ave., N. E., St. Petersburg, Florida 1948
***Dugan, Dr. William Dunbar, 221 Pierce Ave., Hamburg, New York 1945
*Du Mont, Philip A[tkinson], 4114 Fessenden St., N. W., Washington 16, D. C. 1928
Dunbar, Munro, North Portal, Saskatchewan, Canada 1950
Dundas, Lester Harvey, Rice Lake Wildlife Refuge, East Lake, Minnesota 1943
Dunn, George, 7026 College Ave., Kansas City, Missouri 1950
Dunstan, Girvin R., 5030 Huron River Dr., Route 1, Dexter, Michigan 1950
Dunt, R. H., "Lynhurst," Kenilworth Rd., Sale, Cheshire, England 1948
Dusi, Julian L[uigi], Department of Zoology and Entomology, Alabama Polytechnic Institute, Auburn, Alabama 1941
*Duvall, Allen Joseph, Fish and Wildlife Service, Washington 25, D. C. 1942
Dyar, Mrs. Jessie Goss, 974 N. Audubon Rd., Indianapolis 19, Indiana 1948
*Dyer, William A., 112 Allen St., Union City, Michigan 1947
*Eagleson, Joseph P., 85 East Gay St., Columbus 15, Ohio 1943
*East, Ben, Holly, Michigan 1948
*Eastman, Whitney H[askins], General Mills Inc., General Mills Bldg., Minneapolis 1, Minnesota 1941
*Eastwood, Sidney Kingman, 5110 Friendship Ave., Pittsburgh 24, Pennsylvania 1928
Eaton, Stephen W[oodman], Department of Biological Sciences, St. Bonaventure College, St. Bonaventure, New York 1942
Eckelberry, Don [Richard], Bentleyville Rd., Chagrin Falls, Ohio 1948
Eddy, Garrett, 4515 Ruffner St., Seattle 99, Washington 1947
*Edeburn, Ralph M[ilton], Department of Zoology, Marshall College, Huntington, West Virginia 1947
*Edge, Mrs. Charles N[oel], 1215 Fifth Ave., New York 29, New York 1931
*Edwards, Ernest P[reston], Sweet Briar, Virginia 1947
**Edwards, James L., 27 Stanford Place, Montclair, New Jersey 1947
**Edwards, Robert Davis, % Stock Trend Service, 95 State Street, Springfield, Massachusetts 1945
***Edwards, Robert L[omas], Department of Biology, Harvard University, Cambridge 38, Massachusetts 1945
Edwards, R[oger] York, Department of Zoology, University of British Columbia, Vancouver, British Columbia, Canada 1948
*Edwards, Sylvia P. (Mrs. Robert L.), Department of Biology, Harvard University, Cambridge 38, Massachusetts 1946
*Eichler, Herbert Philip, 2211 Andrews Avenue, New York 53, New York 1949
*Eifert, Virginia S[nider] (Mrs. Herman D.), 705 W. Vine St., Springfield, Illinois 1941
***Eisenmann, Eugene, 11 Broadway, New York 4, New York 1942

Eisenmayer, Miss Betty Jean, 1917 N. Main Ave., Springfield 1, Missouri 1948
*Ekblaw, Dr. George Elbert, 511 W. Main St., Urbana, Illinois 1914
*Ekdahl, Conrad H[oward], 401 N. Stone Ave., LaGrange, Illinois 1949
**Eklund, Dr. Carl M[ilton], Rocky Mountain Laboratory, Hamilton, Montana 1945
*Elder, William H[anna], Wildlife Conservation Bldg., University of Missouri, Columbia, Missouri 1938
Ellarson, Robert S[cott], 431 Sterling Court, Madison 5, Wisconsin 1948
Ellett, C[layton] W[ayne], Department of Botany, Ohio State University, Columbus, Ohio 1948
*Elliott, Dr. Richard M., 1564 Vincent St., St. Paul 8, Minnesota 1940
Ellis, Miss Hazel Rosetta, Keuka College, Keuka Park, New York 1942
Elstone, Robert Oliver, 249 Charlton Ave. West, Hamilton, Ontario, Canada 1949
Emerson, David L[owell], 25 Everett Ave., Providence, Rhode Island 1939
***Emerson, Guy, 16 E. 11th St., New York 3, New York 1938
**Emilio, S[hepard] Gilbert, Route 4, Laconia, New Hampshire 1929
**Emlen, John Thompson Jr., Department of Zoology, University of Wisconsin, Madison 6, Wisconsin 1936
*English, P[ennoyer] F[rancis], Professor of Wildlife Management, Department of Zoology, Pennsylvania State College, State College, Pennsylvania 1934
Ennis, J[ames] Harold, Cornell College, Mt. Vernon, Iowa 1942
Erickson, John G[erhard], 1628 Louisiana Avenue, Minneapolis 16, Minnesota 1949
*Erickson, Mary M[arilla], Santa Barbara College, Santa Barbara, California 1930
Erickson, Ray Charles, Box 113, Malheur National Wildlife Refuge, Burns, Oregon 1939
**Errington, Paul Lester, Iowa State College, Ames, Iowa 1932
Eshleman, S[ilas] Kendrick III, 4045 Pine St., Philadelphia 4, Pennsylvania 1947
Eskew, Cletis Theodore, 2010 Pearl St., Wichita Falls, Texas 1949
**Eslinger, Kenneth N., % Josten's, 2019 Crawford St., Terre Haute, Indiana 1950
*Estes, J. K., 1909 Speedway, Wichita Falls, Texas 1950
**Eustice, Mrs. Alfred L., 1138 Sheridan Rd., Evanston, Illinois 1944
*Evans, Evan Morton, 550 Park Ave., New York, New York 1929
Evans, Robert L[eland], Rondaxe Mountain Fire Tower, Old Forge, New York .. 1949
Evans, Sylvia H. (Mrs. Harold), "Awbury," Germantown, Philadelphia 38, Pennsylvania 1949
*Evenden, Fred G[eorge] Jr., United States Fish and Wildlife Service, River Basin Studies Signal Depot, Sacramento, California 1948
**Everest, David Clark, Rothschild, Wisconsin 1949
Everett, Miss Constance Antoinette, 206 Ninth St. N.E., Waseca, Minnesota 1948
Eye, Osbra Lee, New, West Virginia 1950
*Eynon, Alfred E., 5 Beach Rd., Verona, New Jersey 1947
*Eyster, Marshall Blackwell, Department of Biology, Southwestern Louisiana Institute, Lafayette, Louisiana 1947
Fairbanks, Virginia (Mrs. Paul H.), United States Forest Service, Pinehurst Ranger Station, Miramonte, California 1949
Fales, John H[ouse], 1917 Elkhart St., Silver Spring, Maryland 1939
Falls, J. Bruce, 173 Arlington Ave., Toronto, Ontario, Canada 1948
**Fargo, William G[ilbert], 506 Union St., Jackson, Michigan 1923
**Farmer, Earl Wilson, Box 1362, Steubenville, Ohio 1946
*Farner, Donald S[ankey], Department of Zoology, The State College of Washington, Pullman, Washington 1941

Farrand, H. F., 7 Guest Lane, Wilmington 280, Delaware 1950
Farrar, William Edmund Jr., 184 College St., Macon, Georgia 1950
Fast, Arthur H., 4924 Rock Spring Rd., Arlington, Virginia 1950
*Fawver, Ben J[unior], State Teachers College, Mankato, Minnesota 1948
*Fedore, Robert R., 2781 Greytower Rd., Route 7, Jackson, Michigan 1949
*Feighner, Miss Lena Veta, 298-1 S. Tremont St., Kansas City 2, Kansas 1935
***Feigley, Miss Margaret D[enny], 544 Chestnut St., Winnetka, Illinois 1944
*Fennell, Chester M[artin], Post Engineers, Kyoto Post Command, APO 9, San Francisco, California 1949
Ferguson, Denzel Edward, 142 Kings Rd., Corvallis, Oregon 1950
*Ferguson, William, 5907 Mason St., Omaha, Nebraska 1946
*Fermanich, Carl Vincent, Kenmare, North Dakota 1950
Ferris, Frank F., 2828 Idlewood Ave., Youngstown, Ohio 1950
*Fichter, Edson Harvey, 256 S. 11th Ave., Pocatello, Idaho 1948
Fickett, Steve Burrows Jr., Box 29, Gulf Hammock, Florida 1950
Findley, J[ohn] Scott, 1201 S. Center Ave., Sioux Falls, South Dakota 1949
Finninger, Paul Charles, 1533 College St., Topeka, Kansas 1950
*Finster, Miss Ethel B., Louisburg College, Louisburg, North Carolina 1931
*Fischer, Richard B[ernard], Laboratory of Ornithology, Fernow Hall, Cornell University, Ithaca, New York 1942
**Fish, William Ralph, 302-B Entwistle St., China Lake, California 1950
*Fisher, Mrs. Glen, Route 3, Box 168, Oshkosh, Wisconsin 1948
*Fisher, Harvey I[rvin], Department of Zoology, University of Illinois, Urbana, Illinois 1949
*Fleisher, Edward, Brooklyn College, Brooklyn 10, New York 1947
Fleugel, James Bush, 1104 American National Bank Bldg., Kalamazoo, Michigan 1942
*Flexner, John Morris, 1331 Yale Station, New Haven, Connecticut 1948
*Fluck, Paul H., 73 N. Union St., Lambertville, New Jersey 1949
*Fluekiger, Miss Dora Whitman, Hotel Dauphin, Broadway at 67th St., New York 23, New York 1948
Flyger, Vagn F., Box 8, Solomons, Maryland 1950
**Foley, Edward J[ames], 5349 N. Bay Ridge Ave., Milwaukee 11, Wisconsin 1947
Folger, Miss Edith Virginia, Campus Gates Manor, Oxford, Ohio 1946
*Foote, Maurice E[dwin], 269 Lawrence St., Ravenna, Ohio 1932
Ford, Edward R[ussell], Newaygo, Michigan 1914
Fordham, Stephen Crane Jr., Delmar Game Farm, Delmar, New York 1948
Forsyth, Mrs. Louise A[nn], 71 Lebanon Rd., Hanover, New Hampshire 1940
Forsyth, Max Allyn, 1114 Mourer St., New Castle, Indiana 1948
Foster, Edwin G[arfield], 36 Arvine Park, Rochester 11, New York 1948
Foster, John Bristol, 136 Dawlish Ave., Toronto 12, Ontario, Canada 1950
Foster, Thomas H., West Road, Bennington, Vermont 1950
*Fox, Adrian C., Box 1451, Lincoln, Nebraska 1937
Fox, W[illiam] Sherwood, 270 Regent St., London, Ontario, Canada 1949
Francis, George [Reid], 382 Hillsdale Ave. E., Toronto 12, Ontario, Canada 1949
Frazier, Harold H[erman], 357 N. 1st East, Logan, Utah 1949
*Fredrickson, Richard William, 1019 Kentucky St., Lawrence, Kansas 1947
**French, Elizabeth Thomas (Mrs. C. T.), 1801 Las Lomas, Albuquerque, New Mexico 1943
Frey, Rev. Edward Snively, 517 Hummel Ave., Lemoyne, Pennsylvania 1950
*Fries, Waldemar Hans, 220 Valley Rd., Merion Station, Pennsylvania 1947

Frohling, Robert C[harles], 1218 Plane St., Union, New Jersey 1949
*Frost, Herbert Hamilton, Ricks College, Rexburg, Idaho 1941
*Frye, O. Earle Jr., Game & Fresh Water Fish Commission, Tallahassee, Florida .. 1940
*Fryman, Miss Kathryn E[lizabeth], 114 Oak St., Wyandotte, Michigan 1943
*Furniss, Owen C[ecil], Alberni, Vancouver Island, British Columbia, Canada 1934
*Gabrielson, Ira N[oel], 1807 Preston Rd., Parkfairfax, Alexandria, Virginia 1913
Gairloch, Stanley S[tanford], Kingston, Rhode Island 1948
*Gale, Larry R[ichard], Box 296, Frankfort, Kentucky 1948
*Galley, John E[dmond], 1610 W. Holloway Ave., Midland, Texas 1945
Gallup, Frederick Norman, Box 614, Escondido, California 1947
***Gammell, R[obert] T[heodore], Kenmare, North Dakota 1943
**Ganier, Albert F[ranklin], 2112 Woodlawn Drive, Nashville 5, Tennessee 1915
Garner, William V[aughn], 447 E. Wadsworth St., Philadelphia 19, Pennsylvania .. 1948
Garrett, Miss [Mary] Lois, 1709 Chestnut St., Kenova, West Virginia 1942
Garrett, Miss Vivian L., Box 135, Hiram, Ohio 1949
Garrison, David L[loyd], Lincoln, Massachusetts 1940
Garrity, Devin A[dair], 23 E. 26th St., New York 10, New York 1949
Gashwiler, Jay S., Fish and Wildlife Service, 436 Federal Bldg., Salt Lake City, Utah 1944
*Gates, Miss Doris [Berta], 814 W. 4th, North Platte, Nebraska 1948
Gates, Mabelle F. (Mrs. Clough), 714 6th Ave. E., Superior, Wisconsin 1949
**Gay, J. Adele (Mrs. Leslie N.), "Gay Willows," Hollins Ave., Baltimore 10, Maryland 1949
Gensch, Robert Henry, United States Fish and Wildlife Service, 1001 Fidelity Bldg., Kansas City 6, Missouri 1939
George, John L[othar], Department of Zoology, Vassar College, Poughkeepsie, New York 1939
Gershten, Miss Blossom, Biology Department, Lake Forest College, Lake Forest, Illinois 1949
Gerstell, Richard, 355 North West End Ave., Lancaster, Pennsylvania 1939
Getzendaner, Mrs. Georgia Belle, 1814 Santa Fe., Corpus Christi, Texas 1950
Gibson, George G[ordon], 265 Sheldrake Blvd., Toronto, Ontario, Canada 1949
Gibson, Col. Robert Howard, Route 2, Box 336, St. Helena, California 1949
*Gier, Herschel Thomas, Department of Zoology, Kansas State College, Manhattan, Kansas 1937
Giesecke, Louise Bittner (Mrs. G. E.), 1307 11th Ave. N., Fargo, North Dakota .. 1950
Gifford, Dr. Harold, 3636 Burt Ave., Omaha, Nebraska 1936
Gilbert, Kathryn Helen, 714 1st Ave. W., Grand Rapids, Minnesota 1945
Gill, C[harles] T[erry], Box 1607, Harlingen, Texas 1947
Gill, Geoffrey, 24 Overlook Drive, Huntington, Long Island, New York 1949
**Gillen, Harold W., Denslow Rd., New Canaan, Connecticut 1944
*Gilliard, Ernest Thomas, American Museum of Natural History, Central Park W. at 79th St., New York 24, New York 1949
Giltz, Maurice L[eroy], Department of Zoology and Entomology, Ohio State University, Columbus 10, Ohio 1939
Ginn, William Edward, 511 E. Van Buren, Columbia City, Indiana 1941
Glandon, Earl W., Stapleton, Nebraska 1950
Glass, Miss Ruth, R.F.D. 1, Box 121, New Cumberland, West Virginia 1950
Glazier, William H[enry] M[onroe], 36 High St., Peterborough, New Hampshire .. 1948
Glenn, Robert W., 509 Orchard Ave., Avalon, Pittsburgh 2, Pennsylvania 1934

Glick, Bruce, 103 S. Franklin Ave., Margate, New Jersey 1949
**Glore, W[alter] S[cott] Jr., 350 Maple Ave., Danville, Kentucky 1947
Glover, Fred A[rthur], Wildlife Management, Humboldt State College, Arcata, California 1947
*Goebel, Herman [John], 78–52 80th St., Brooklyn 27, New York 1946
Goellner, Karl Eugene, Coe College, Cedar Rapids, Iowa 1950
**Goetz, Christian John, 3503 Middleton Ave., Cincinnati 20, Ohio 1930
*Goldman, George M., 1755 N. Decatur Rd., N. E., Atlanta, Georgia 1947
Good, Ernest E[ugene], Department of Zoology and Entomology, Ohio State University, Columbus 10, Ohio 1937
Good, Wallace M., 1920 Massachusetts St., Lawrence, Kansas 1949
*Goodman, John David, Department of Zoology, University of Michigan, Ann Arbor, Michigan 1944
Goodpasture, Mrs. E. W., 408 Fairfax Ave., Nashville 5, Tennessee 1950
*Goslin, Charles R[ussell], 726 E. King St., Lancaster, Ohio 1940
*Goslin, Robert M[artin], 316 Wilson Ave., Columbus 5, Ohio 1936
Gosner, Kenneth Lynn, 698 Clifton Ave., Newark, New Jersey 1948
*Gowanloch, James Nelson, Department of Wildlife and Fisheries, 126 Civil Courts Bldg., New Orleans, Louisiana 1949
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Graber, Richard R., 210 W. 10th St., Florence, Kansas 1949
**Gram, Margaret [Edwards] (Mrs. H. James Jr.), 207 McKinley, Detroit 30, Michigan 1941
*Grange, Wallace, Babcock, Wisconsin 1930
*Grant, Cleveland P[utnam], 245 Davis St., Mineral Point, Wisconsin 1928
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Graves, Miss [Cynthia] Katherine, 1209 N. Illinois St., Apt. 28, Indianapolis 2, Indiana 1942
Grayce, Robert, 141 Main St., Rockport, Massachusetts 1946
***Greeley, Fred[erick], University Houses 15-B, Eagle Heights, Madison, Wisconsin 1942
*Green, N[orman] Bayard, Department of Zoology, Marshall College, Huntington 1, West Virginia 1943
**Greene, Albert E., 517 Oswego St., Ann Arbor, Michigan 1939
Greenhalgh, Clifton M., 1230 E. 1st St., S., Salt Lake City 2, Utah 1939
Greenwalt, Ernest J., Wichita Refuge, Cache, Oklahoma 1950
*Greer, Rev. Edward C., 422 E. 10th St., Davenport, Iowa 1948
Gregg, Pearl, Middlebourne, West Virginia 1949
*Gregory, Stephen S[trong] Jr., Box N., Winnetka, Illinois 1922
Griffee, W[illet] E., 510 Yeon Bldg., Portland 4, Oregon 1947
*Griffin, William W[elcome], 211 N. Madison St., College Park, Georgia 1946
**Grimes, S[amuel] A[ndrew], 4627 Peachtree Circle E., Jacksonville 7, Florida 1924
*Grimm, William C[arey], Pocono Lake, Pennsylvania 1939
***Grinnell, Lawrence I[rving], 710 Triphammer Rd., Ithaca, New York 1939
**Griscom, Ludlow, Museum of Comparative Zoology, Cambridge 38, Massachusetts 1937
*Groesbeck, William M[aynard], 376 Seneca Rd., Hornell, New York 1947
Grose, E. R., Box 38, Sago, West Virginia 1939
*Groskin, Horace, 210 Glenn Road, Ardmore, Pennsylvania 1937

*Gross, Alfred Otto, 11 Boody St., Brunswick, Maine 1927
*Grube, G[eorge] E[dward], Department of Biology, Gettysburg College, Gettysburg, Pennsylvania 1948
*Gruenewald, Robert Franklin, Box 422, Sanborn, Iowa 1948
Guhl, A[lphaeus] M[atthew], Department of Zoology, Kansas State College, Manhattan, Kansas 1948
Gullion, Gordon W[right], Museum of Vertebrate Zoology, University of California, Berkeley 4, California 1947
*Gunderson, Harvey Lorraine, Museum of Natural History, University of Minnesota, Minneapolis 14, Minnesota 1941
*Gunn, W[illiam] W[alker] H[amilton], 178 Glenview Ave., Toronto 12, Ontario, Canada 1945
Hadeler, Catherine [Wilma], 900 Harmon Ave., Dayton 9, Ohio 1945
*Hadley, Thomas E., 306 S. Saginaw St., Holly, Michigan 1944
**Hagar, Mrs. Jack, Box 339, Rockport, Texas 1930
**Hagar, Joseph A., Pleasant St., Marshfield Hills, Massachusetts 1949
*Hague, Florence S., Sweet Briar College, Sweet Briar, Virginia 1931
*Haines, Robert L[ee], 54 E. Main St., Moorestown, New Jersey 1947
*Haines, T. P., 1395 Adams St., Apt. E., Macon, Georgia 1941
*Hainsworth, William P[ickard], 216 Railroad Ave., North Andover, Massachusetts 1930
*Hale, James B[all], 405 Washburn Place, Madison 3, Wisconsin 1947
Hall, Fran, 518 Union St., Northfield, Minnesota 1950
**Hall, Fred T., Davenport Public Museum, 704 Brady St., Davenport, Iowa 1937
*Hall, George A[rthur], Department of Chemistry, West Virginia University, Morgantown, West Virginia 1946
*Hall, Mrs. Gladys A[reta], 912 Douglas Ave., Kalamazoo 52, Michigan 1947
Halladay, Ian R[ussel], 218 Belsize Dr., Toronto 12, Ontario, Canada 1948
*Haller, Frank D[enver], 235 E. Mechanic St., Bloomfield, Indiana 1940
Haller, Lt. Karl W., Box 3344, Killeen Base, Killeen, Texas 1934
*Hallman, Roy Cline, Box 435, Port St. Joe, Florida 1928
**Hamann, Carl F[erdinand], Maple Lane, Aurora, Ohio 1947
*Hamerstrom, Frances [Mrs. Frederick N. Jr.], Plainfield, Wisconsin 1948
*Hamerstrom, Frederick N. Jr., Plainfield, Wisconsin 1934
*Hamilton, Charles W[hiteley], 2639 Fenwood Rd., Houston 5, Texas 1948
*Hamilton, William J[ohn] Jr., Department of Conservation, Cornell University, Ithaca, New York 1933
*Hammond, Merrill C[lyde], Lower Souris Refuge, Upham, North Dakota 1939
Hamnett, William Lawrence, 2809 Kittrell Dr., Raleigh, North Carolina 1950
*Hampe, Irving E., 5559 Ashbourne Rd., Halethorpe, Baltimore 27, Maryland 1945
*Hamrum, Charles L[owell], Department of Biology, Gustavus Adolphus College, St. Peter, Minnesota 1949
Hancock, James W[illiam], Route 1, Madisonville, Kentucky 1946
*Handley, Charles Overton Sr., 6571 Roosevelt Ave., Charleston 4, West Virginia 1925
*Handley, Charles Overton Jr., Museum of Zoology, University of Michigan, Ann Arbor, Michigan 1941
**Hann, Harry W[ilbur], 1127 Church St., Ann Arbor, Michigan 1930
*Hanna, Wilson Creal, 141 E. F St., Colton, California 1936
Hansen, Norman J., 223 N. Franklin St., Ames, Iowa 1950
Hansman, Robert H[erbert], 1215 Ave. F, Fort Madison, Iowa 1948

Hanson, E[lmer] C[harles], 1305 Wisconsin Ave., Racine, Wisconsin 1940
Harder, Richard C., Matfield Green, Kansas 1949
Hardy, [Cecil] Ross, Professor of Biological Science, Orange-Los Angeles State College, 5400 E. Anaheim St., Long Beach 4, California 1940
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*Harford, Dr. Henry M[inor], 926 Argyle Bldg., Kansas City 6, Missouri 1946
*Harley, James Bickel, Route 1, Box 394, Pottstown, Pennsylvania 1947
Harmon, Dr. Karl S., 209 S. Walnut St., Eldon, Missouri 1947
*Harper, Francis, Huyck Preserve, Rensselaerville, New York 1930
Harrell, Byron Eugene, 1594 Stanford Ave., St. Paul 5, Minnesota 1943
Harrington, Fr. Elwin Raymond, O. F. M., Duns Scotus College, 9 Mile and Evergreen Roads, Detroit 19, Michigan 1950
Harrington, Dr. Paul, 813 Bathurst St., Toronto 4, Ontario, Canada 1948
**Harriot, Samuel C[arman], 200 W. 58th St., New York 19, New York 1934
Harris, Albert, Box 206, Hillsboro, North Dakota 1950
Harris, Dave, Box 84, Deadwood, South Dakota 1947
Harris, Stuart Kimball, 33 Lebanon St., Winchester, Massachusetts 1946
**Harrison, Hal H., 1102 Highland St., Tarentum, Pennsylvania 1941
Harry, Gordon Bryan, 6160 Flushing Rd., Flushing, Michigan 1950
Hartley, Albert Thomas, Columbiana, Ohio 1944
*Hartman, Frank A[lexander], Hamilton Hall, Ohio State University, Columbus, Ohio 1941
*Hartmeister, Felix A., Box D, Horicon, Wisconsin 1949
*Hartwell, Arthur M[owry], 1506 Mt. Curve, Minneapolis, Minnesota 1940
Hartwell, Reginald Warner, 121 N. Fitzhugh St., Rochester 14, New York 1947
Harwell, Charles Albert, 2630 Hilgard Ave., Berkeley 9, California 1948
Haskins, Mrs. Edith D., 39 Park St., Hanover, New Hampshire 1941
*Hatch, [Clara] Grenville, 1548 Wilhelmina Rise, Honolulu 17, Hawaii 1948
Hauschild, John Orville, 922 Club Dr., High Point, North Carolina 1949
Hausler, Mrs. M., 7348 Paxton Ave., Chicago, Illinois 1936
**Havemeyer, Henry O[sborne], Mahwah, New Jersey 1930
Haverschmidt, Fr., Box 644, Paramaribo, Surinam, Dutch Guiana 1946
Hawkins, B. L., Hamline University, St. Paul 4, Minnesota 1936
*Hawkins, Naomi M., 401 W. Pine St., Missoula, Montana 1948
Hawksley, Mrs. Janet P., 123 Lafayette Circle, Cincinnati, Ohio 1942
Hawksley, Oscar, Department of Biology, Central Missouri State College, Warrensburg, Missouri 1948
*Hayden, H. Vincent, 157 Hobart St., Danvers, Massachusetts 1950
*Hazard, Frank Orlando, Wilmington College, Wilmington, Ohio 1946
Hazard, Norwood [Cady], 2815 Sheridan St., Davenport, Iowa 1949
*Heaps, Pearl, 1916 Park Ave., Baltimore 17, Maryland 1949
**Hebard, Frederick V[anuxem], 1500 Walnut St. Bldg., Philadelphia 2, Pennsylvania 1940
Hecht, William Robert, 104 Ripley St., Columbia, Missouri 1950
*Heckler, Sydney B., 1207 N. 7th St., St. Louis 6, Missouri 1942
*Hedges, Harold C[harles], Route 2, Lake Quivira, Kansas City 3, Kansas 1940
Heed, William B[attles], 101 West Virginia Ave., West Chester, Pennsylvania 1947
*Heffelfinger, George W[right] P[eavey] Jr., Route 2, Mound, Minnesota 1948
*Hefley, Harold M[artin], Division of Biological Sciences, Mississippi Southern College, Station A, Hattiesburg, Mississippi 1942

Heiser, J[oseph] M[atthew] Jr., 1724 Kipling St., Houston, Texas 1939
Helfer, Louise, 111 Ninth St., Watkins Glen, New York 1938
Henderson, Hon. William L., Gibson Island, Maryland 1950
Henderson, Georgia Anne, 63 Old Forest Hill Rd., Toronto, Ontario, Canada 1950
Hendricks, G[eorge] Bartlett, % The Berkshire Museum, Pittsfield, Massachusetts 1943
*Hendrickson, George O[scar], Department of Zoology and Entomology, Iowa State College, Ames, Iowa 1933
Hengst, Mrs. James R., 2111 Park Hill Dr., Columbus 9, Ohio 1948
*Henry, C. J., Seney National Wildlife Refuge, Germfask, Michigan 1933
*Hensley, Marvin Max, Laboratory of Ornithology, Fernow Hall, Cornell University, Ithaca, New York 1947
*Henwood, Mrs. Ethel May, 604 W. Main St., Urbana, Illinois 1941
*Herman, Carlton M., Patuxent Research Refuge, Laurel, Maryland 1946
Hessin, Miss Twila, Route 2, Nashport, Ohio 1949
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Hetrick, Louis Howard, 85 E. Water St., Gettysburg, Pennsylvania 1950
Hetzel, Ralph Louis, 7322 Cornell, University City 5, Missouri 1950
**Hewitt, Marvin Ward, Greensboro, Maryland 1949
*Hewitt, Oliver H., Fernow Hall, Cornell University, Ithaca, New York 1943
Hibbard, Edmund Arthur, Route 1, St. Cloud, Minnesota 1950
Hick, Edward, 320 Victor St., St. Louis 4, Missouri 1950
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Hicks, Thomas W[illiam], Box 2382, University Station, Gainesville, Florida 1949
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Higgins, Thomas Francis, Box 221, Sound Beach, Long Island, New York 1947
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Hill, Julian Werner, 1106 Greenhill Ave., Wilmington 56, Delaware 1935
Hill, Raymond W., 3316 Kenmore Rd., Shaker Heights, Cleveland 22, Ohio 1941
*Hillmer, Davis B., 8228 Woodward Ave., Detroit 2, Michigan 1926
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Hine, Ruth Louise, Department of Zoology, University of Wisconsin, Madison 5, Wisconsin 1949
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*Hochbaum, [Hans] Albert, Delta, Manitoba, Canada 1942
Hock, Raymond J., Box 960, Arctic Health Research Center, Anchorage, Alaska . 1946
*Hodel, Earl M., Box 305, Elkin, North Carolina 1949
Hodgdon, Kendrick Yale, 16 Welsh St., Frostburg, Maryland 1950
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Hodges, James, 324 W. 31st St., Davenport, Iowa 1946
Hoffmeister, Linus C[hristian], 504 W. Ripa Ave., Lemay 23, Missouri 1939
Hofslund, Pershing B[enard], Biology Department, Duluth Branch, University of Minnesota, Duluth, Minnesota 1944
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Holden, Fenn M[itchell], Box 428, Grayling, Michigan 1947

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Houle, Jeannette Ellen, 1214 5th St., S.E., Minneapolis 14, Minnesota 1950
Houston, C[larence] Stuart, Box 459, Yorkton, Saskatchewan, Canada 1948
Hovey, Percy L., Brookgreen Gardens, Georgetown, South Carolina 1950
Howe, [Henry] Branch Jr., 414 W. Ponce de Leon Ave., Decatur, Georgia 1943
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*Howell, Thomas R[aymond], Museum of Vertebrate Zoology, University of California, Berkeley 4, California 1947
*Hoyt, J[ohn] Southgate Y[eston], Box 54, Etna, New York 1936
*Hubert, Philip Arthur Jr., 17 Lenox Rd., Summit, New Jersey 1948
Hughes, Wallace, 624 S. W., 51st St., Oklahoma City, Oklahoma 1947
*Hughes, Dr. W. W ; Embro, Ontario, Canada 1944
Hulbert, Lloyd Clair, Box 901 C.S., Pullman, Washington 1938
**Humphrey, Philip Strong, Museum of Zoology, University of Michigan, Ann Arbor, Michigan 1948
Hundley, Marion Lee, Box 43, Granville, Ohio 1950
Hunt, Helen C. (Mrs. E. C.), 302 N. Mill St., Eldon, Missouri 1950
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Huntington, Charles Ellsworth, 38 Kildeer Rd., Hamden 14, Connecticut 1950
Hurley, John B[eatty], 401 S. 17th Ave., Yakima, Washington 1937
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Hutchison, Robert B., 1719 Marine St., Boulder, Colorado 1950
Imhof, Thomas A[nthony], 307 38th St., Fairfield, Alabama 1950
**Ingersoll, Albert M[ills], 908 F Street, San Diego 1, California 1921
Ivor, H. Roy, Route 1, Cooksville, Ontario, Canada 1945
Jabinson, Marguerite N. (Mrs. L. R.), 1503 N. Pennsylvania Ave., Apt. 55, Indianapolis 2, Indiana 1946
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Jacobson, Dr. Malcolm A[rthur], 57 W. 57th St., New York 19, New York 1947
Jahn, Laurence Roy, 106½ Lake View Ave., Lake Mills, Wisconsin 1950
James, Douglas Arthur, Vivarium Bldg., University of Illinois, Champaign, Illinois 1946
Jameson, E[verett] W[illiams] Jr., Division of Zoology, University of California, Davis, California 1941
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*Janvrin, Dr. Edmund R[andolph] P[easlee], 38 E. 85th St., New York 28, New York 1942
*Jaques, Florence Page (Mrs. F. L.), 610 W. 116th St., New York 27, New York 1950
**Jaques, F[rancis] L[ee], 610 W. 116th St., New York 27, New York 1939
*Jaques, Dr. H[arry] E[dwin], 709 N. Main St., Mt. Pleasant, Iowa 1949
*Jenkins, James H[obart], Department of Biology, University of Georgia, Athens, Georgia 1939
*Jenner, William A., Apt. 201, 5516 Parkland Court, S.E., Washington 19, D. C. 1933
*Jensen, Mrs. Ove F., RFD, Maple City, Michigan 1948
*Jeter, Horace Hearne, 4534 Fairfield Ave., Shreveport, Louisiana 1950

Johnson, Albert George, 271 South St., Jamaica Plain 30, Massachusetts. 1947
*Johnson, Donald T[heodore], 2336 W. 108th Place, Chicago 43, Illinois. 1947
*Johnson, Frank M[organ], 930 Greenbrier St., Charleston 1, West Virginia. 1946
*Johnson, Irene W. (Mrs. Oscar), 38 Portland Place, St. Louis 8, Missouri. 1931
Johnson, J[ohn] O[scar], 112 7th St., S.E., Watertown, South Dakota. 1948
Johnson, Miss Mabel Claire, 30 Westfield Rd., West Hartford, Connecticut. 1946
Johnson, Myrtle Elizabeth, 4647 55th St., San Diego 5, California. 1948
*Johnson, Robert A[nthony], 98 East St., Oneonta, New York. 1930
**Johnson, Dr. Rodney K[nox], 419 Pine St., Friend, Nebraska. 1949
Johnson, William M[cNutt], Route 6, Knoxville, Tennessee. 1939
Johnston, David Ware, Department of Zoology, University of Georgia, Athens, Georgia. 1943
Johnston, James W[eeks] Jr., 217 N. Wayne St., Arlington, Virginia. 1948
Johnston, Richard F., 2223 Union St., Berkeley 4, California. 1949
*Johnston, Verna R[uth], 1812 W. Sonoma Ave., Stockton, California. 1941
Jones, Glenn Ellis, 1115 W. Garver St., Norman, Oklahoma. 1950
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Jones, John C[ourts], 5810 Namakagan Rd., Washington 16, D. C. 1931
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*Jones, S[olomon] Paul, 509 West Ave., N., Waukesha, Wisconsin. 1921
Jones, Thelma F., 2422 E. 74th St., Chicago 49, Illinois. 1949
Jorae, Irene Frances, Central Michigan College of Education, Mt. Pleasant, Michigan. 1942
Joyner, J[ohn] W[illiam] E[dwin], Box 647, Rocky Mount, North Carolina. 1947
*Jung, Clarence [Schram], 6383 N. Port Washington Rd., Milwaukee 9, Wisconsin. . 1921
*Jurica, E., Lisle, Illinois. 1940
Kaerne, William H[arald], 127 Ruby St., Winnipeg, Manitoba, Canada. 1949
Kahmann, Karl W., Route 2, Hayward, Wisconsin. 1941
*Kahn, Dina H[ope] (Mrs. Reuben L.), 1122 Michigan Ave., Ann Arbor, Michigan. . 1938
*Kalmbach, Edwin Richard, Fish and Wildlife Service, 546 Custom House, Denver 2, Colorado. 1926
*Kampf, Roy C., 555 Ruth St., Bridgeport, Connecticut. 1948
**Kase, John C[harles], 501 Chestnut St., Mifflinburg, Pennsylvania. 1937
Kaspar, John L[oren], 392 23rd St., Oshkosh, Wisconsin. 1947
**Keating, Dr. F[rancis] Raymond Jr., 620 10th Ave., S.W., Rochester, Minnesota. . 1944
Keeley, Katherine, 4801 3rd St., N.W., Washington, D. C. 1950
Keely, Josiah, Box 383, Huntington, Long Island, New York. 1947
**Kelker, George H., School of Forestry, Utah State Agricultural College, Logan, Utah. 1938
Keller, C[harles E[dward], 637 Eastern Ave., Indianapolis 1, Indiana. 1946
Keller, Richard T[homas], 717 S. 16th St., St. Joseph, Missouri. 1943
*Kelley, Mrs. Eliza Mabel, 71 Division St., Newport, Rhode Island. 1948
*Kelley, William N[eal], Route 14, Box 1070, Affton 23, Missouri. 1948
Kelly, George Fleming, Department of Research and Education, Solomons, Maryland. 1947
*Kelsey, Homer Stone, 16 Chestnut St., Spring Valley, New York. 1945
Kelsey, Paul Manning, Route 1, Newfield, New York. 1948
*Kelso, Leon H[ugh], 1370 Taylor St., N.W., Washington 11, D. C. 1930
Kemnitzer, Allen E[dward], 969 Five Mile Line Rd., Webster, New York. 1949

*Kemsies, Emerson, 102 Farragut Rd., Greenhills 18, Ohio. 1948
Kenaga, Eugene E., 1629 Isabella Rd., Route 5, Midland, Michigan. 1949
*Kendeigh, S[amuel] Charles, Vivarium Building, University of Illinois, Champaign, Illinois 1923
**Kennedy, Bruce A[lbert] H[amilton], 389 West 10th Avenue, Columbus 1, Ohio. . . 1947
Kenyon, Karl W[alton], Fish and Wildlife Service, 2725 Montlake Blvd., Seattle 2, Washington 1948
*Kersey, Lulu Brooks (Mrs. Glen B.), 647 Gordon Terrace, Chicago 13, Illinois. . . . 1948
Kersting, Cecil Carl, 3722 East Apple, Route 6, Muskegon, Michigan. 1950
Kessel, Miss Brina, Fernow Hall, Cornell University, Ithaca, New York. 1946
Ketner, Keith B[rindley], 915 W. Reynolds St., Plant City, Florida. 1949
Kiefer, Elizabeth D[eyo] (Mrs. Francis), 243 Gratiot Blvd., Port Huron, Michigan 1941
***Kieran, John, 4506 Riverdale Ave., New York 63, New York. 1942
Kildow, T[homas] Monroe, Box 520, Tiffin, Ohio. 1948
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Kimball, Miss Mary Boydston, 809 Main St., Sistersville, West Virginia. 1950
Kindler, Mrs. Grace E[mma], Sheridan Drive, Route 1, Lancaster, Ohio. 1937
King, John Arthur, Laboratory of Vertebrate Biology, University of Michigan, Ann Arbor, Michigan 1947
**King, Louise E. (Mrs. Stanley), 5533 Bryant Ave., S., Minneapolis, Minnesota. . 1944
*King, Margaret Jane, Physiology Department, Medical College of South Carolina, Charleston 16, South Carolina 1949
*Kirkpatrick, Charles M., Department of Forestry, Purdue University, West Lafayette, Indiana. 1948
Kitz, William Martin, Box D, Horicon, Wisconsin. 1950
Kizer, Richard Allen, 303½ State St., West Lafayette, Indiana. 1947
**Klein, Richard P[aul], Jackson Rd., Route 4, Chagrin Falls, Ohio. 1946
*Kletzly, Robert C[harles], Conservation Commission, Romney, West Virginia. . . . 1948
Klimstra, W[illard] D[avid], Zoology Department, Southern Illinois University, Carbondale, Illinois 1948
Klonick, Allan S., 828 Grosvenor Rd., Rochester 18, New York. 1941
Kluge, Miss Helen H[enrika], Woodtick Rd., Waterbury 12, Connecticut. 1942
Knollmeyer, Lewis Edward, Department of Commerce and Economics, University of Vermont, Burlington, Vermont 1945
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Koehler, Mrs. Arthur, 2308 11th Ave., Los Angeles 16, California. 1941
*Kolb, C[harles] Haven Jr., 5021 Midwood Ave., Baltimore 12, Maryland. 1937
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*Kossack, Charles W[alter], 715 S. Division St., Barrington, Illinois. 1945
*Kozicky, Edward L[ouis], Department of Zoology and Entomology, Iowa State College, Ames, Iowa 1943
*Kramar, Nada, 1906 K St., N.W., Washington 6, D. C. 1947
*Kramer, Theodore C[hristian], 1307 Granger Ave., Ann Arbor, Michigan. 1939
Kraus, Douglas L[awrence], Rhode Island State College, Kingston, Rhode Island. . 1942
Krebs, Juanita F[ile] (Mrs. R. W.), 3576 N. Blvd., Baton Rouge 12, Louisiana. . . . 1946
Krug, Howard H[enry], Chesley, Ontario, Canada. 1944
Krumm, Kenneth, Lacreek National Wildlife Refuge, Martin, South Dakota. . . . 1948

*Kugel, Miss Agnes R[ose], Botany Department, Grand Rapids Junior College, Grand Rapids, Michigan 1946
Kuhn, Kenneth H[erbert], 3734 N. 53rd St., Milwaukee 16, Wisconsin 1949
Kuitert, Louis Cornelius, Agricultural Experiment Station, University of Florida, Gainesville, Florida 1938
*Kutz, George C[arl], 705 S. Holcombe Street, Stillwater, Minnesota 1944
Kyle, Mrs. Jennie Lynne, 2000 Albemarle Place, Winter Park, Florida 1947
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Laakso, Martin, Westminister College, Fulton, Missouri 1948
Lacey, Miss Mifton H., Box 614, Canton, Ohio 1939
Lacey, Mrs. Trammell Calhoun, Box 328, Nacogdoches, Texas 1950
*Lagler, Karl F., Department of Zoology, University of Michigan, Ann Arbor, Michigan 1941
Laing, Charles Corbett, 762 N. Van Buren St., Milwaukee 2, Wisconsin 1948
Lake, Robert N., Woodstock, Vermont 1941
Lambert, Adaline Train (Mrs. Howard T.), 1903 Ross St., Sioux City, Iowa 1947
***Lambert, Bert H., The Huntington Hotel, Pasadena, California 1936
*Lancaster, Douglas A[lan], 1437 8th St., S., Fargo, North Dakota 1949
*Land, Hugh Colman, 3372 8th St. Road, Huntington, West Virginia 1950
*Larrabee, Austin Park, 4815 Beach Dr., Seattle 6, Washington 1921
*Laskey, Amelia Rudolph (Mrs. Frederick Charles), 1521 Graybar Lane, Nashville 12, Tennessee 1928
*Latimer, Alice Roana, 1014 8th St., Bismarck, North Dakota 1950
Latzko, Gordon Charles, Box 160, Muhlenberg College, Allentown, Pennsylvania 1948
*Lawlor, Abigail (Mrs. Gene), Victor, Iowa 1947
Lawrence, Mrs. Louise de Kiriline, Rutherglen, Ontario, Canada 1946
Lawrie, James Harry, 16560 Oakfield Ave., Detroit 35, Michigan 1950
Lay, Daniel Wayne, Buna, Texas 1939
*Lea, Robert B[ashford], 24 N. Worth Ave., Elgin, Illinois 1940
Leavitt, Benjamin Burton, Department of Biology, University of Florida, Gainesville, Florida 1947
*Lee, [William] Donald, 431 Greenmount Blvd., Dayton 9, Ohio 1947
**Lee, Miss Zell Charlotta, 1423 Douglas St., Sioux City 18, Iowa 1946
*Leebrick, Karl C[layton] Jr., Route 3, Canastota, New York 1946
*Leedy, Daniel L[ovey], Fish and Wildlife Service, Branch of Wildlife Research, Washington 25, D. C. 1936
*Legg, William C[larence], Mt. Lookout, West Virginia 1939
Lehrman, Robert L., 412 E. 79th St., New York 21, New York 1950
**Lengemann, Miss Martha A., 360 Cedar St., Imlay City, Michigan 1946
*Leopold, A[ldo] Starker, Museum of Vertebrate Zoology, Berkeley 4, California 1940
*Leopold, Frederic, Burlington, Iowa 1950
Levi, Herbert W., University of Wisconsin, Extension Center, Wausau, Wisconsin 1949
Levy, Alice K[lund] (Mrs. H. P.), 840 Seward St., Hollywood 38, California 1941
Lewis, C. Bernard, The Science Museum, Institute of Jamaica, Kingston, Jamaica, British West Indies 1947
*Lewis, Harrison Flint, Dominion Wildlife Service, Department of Mines and Resources, Ottawa, Ontario, Canada 1939
*Lewis, Brother Hubert, La Salle Institute, Glencoe, Missouri 1940
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Lieftinck, John E[dmund], 1826 W. Market St., Akron 13, Ohio. 1945
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*Lincoln, Frederick Charles, Fish and Wildlife Service, Washington 25, D. C. 1914
Lindauer, Millard R., 8509 Atlantic Ave., Margate, New Jersey. 1949
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Longley, William H[oward], Box 362, Kasson, Minnesota. 1943
Lord, Frederick P[omeroy], 39 College St., Hanover, New Hampshire. 1939
Loring, George G[ardner], Prides Crossing, Massachusetts. 1949
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Lukens, William Weaver Jr., Upper Gulph Rd., Radnor, Pennsylvania. 1947
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*MacMullan, R[alph] Austin, Game Division, Department of Conservation, Lansing 13, Michigan. 1940
*MacQueen, Mrs. Peggy Muirhead, 48 New Jersey Ave., Bergenfield, New Jersey. . 1940
McAlister, [James] Don, 1723 Cardiff Rd., Columbus 12, Ohio. 1949
McAllister, Claude Huntley Jr., Route 2, Box 171, Wilmington, North Carolina. . 1950
*McAtee, Waldo Lee, 3 Davie Circle, Chapel Hill, North Carolina. 1911
***McCabe, Robert A[lbert], 424 University Farm Place, Madison, Wisconsin. . . . 1942
*McCamey, [Benjamin] Frank[lin] [Jr.], Plant Science Department, University of Connecticut, Storrs, Connecticut. 1945
*McClure, Bernice, 2543 Woodburn Ave., Apt. 10, Cincinnati 6, Ohio. 1948
**McClure, H[owe] Elliott, Box 292, Station A., Bakersfield, California. 1942

McClure, John Francis, 7050 N. Oatman Ave., Portland 17, Oregon 1949
*McConnell, H. B., 142 E. Warren St., Cadiz, Ohio 1948
McCravy, Tucker, 78 Ridge Rd., Lyman, South Carolina 1949
**McCue, Earl Newlon, Box 104, Morgantown, West Virginia 1941
*McCullagh, Dr. E[rnest] Perry, 2020 E. 93rd St., Cleveland, Ohio 1937
McDonald, Malcolm E., Box 42, Ann Arbor, Michigan 1936
McEldowney, Sue Hiett, 705 Washington St., Newell, West Virginia 1949
McEntee, Elinor G. (Mrs. Howard G.), 490 Fairfield Ave., Ridgewood, New Jersey 1948
**McGaw, Elizabeth T[aylor] (Mrs. G. Hampton), 18 Beech St., Woodsville, New Hampshire 1945
*McGeen, Daniel S., 1231 Cass Lake Rd., Pontiac, Route 9, Michigan 1944
McKay, Arlie K[yle], Route 2, Box 252, Baytown, Texas 1949
McKay, Reginald R., 1310 Willowbranch, Apt. 18, Jacksonville 5, Florida 1950
*McKeever, Christopher Killian, 1043 Carroll St., Brooklyn 25, New York 1948
McKeever, J[ames] L[awrence], 516 Homewood Ave., Peterborough, Ontario, Canada 1949
McKinley, Daniel L[awson], % Poultry Station, Mountain Grove, Missouri 1948
*McKinley, George G[ael], 104 N. Western Parkway, Louisville 12, Kentucky 1945
McKinney, Robert G[erhard], 86 Hurstbourne Rd., Rochester 9, New York 1948
*McKinney, Mrs. Walter A., 2932 S. Woodward Blvd., Tulsa 5, Oklahoma 1945
*McKnight, Edwin T[hor], 5038 Park Place, Friendship Station, Washington 16, D. C. 1936
McLaughlin, John Harvey, Bellepoint, West Virginia 1949
McLeod, John Allen Jr., 113 E. Hendrix St., Greensboro, North Carolina 1950
McMannama, Miss Zella Vida, 3959 15th Ave., N.E., Seattle 5, Washington 1950
**McMath, Robert R., Lake Angelus, Route 4, Box 104, Pontiac 4, Michigan 1934
McMillan, John Frank, College of St. Thomas, St. Paul, Minnesota 1950
McMurray, Arthur A., 924 Aubra St., Memphis 11, Tennessee 1939
McNeill, Richard E[arl], 10638 Charlevoix Ave., Detroit 14, Michigan 1948
McQuarrie, Harold James, Gore Bay, Manitoulin Island, Ontario, Canada 1950
Maass, Miss Frances Blanche, 85-41 102 St., Richmond Hill, Long Island, New York 18, New York 1948
*Mack, H[orace] G[ordon], % Gilson Mfg. Company Ltd., Guelph, Ontario, Canada 1937
**Mackenzie, Dr. Locke Litton, 829 Park Ave., New York 21, New York 1947
**Madtes, George R[ummel], 622 Glenwood Ave., Youngstown 2, Ohio 1949
Magath, Dr. Thomas Byrd, Mayo Clinic, Rochester, Minnesota 1935
*Magner, J[ohn] Marshall, 516 Bacon Ave., Webster Groves 19, Missouri 1948
*Mahlburg, Milton William, 1109 Grant Ave., Rockford, Illinois 1949
*Mainster, Raymond Waite, 3716 Croydon Rd., Baltimore 7, Maryland 1949
Malinowski, John Carl, Boxwood, 323 N. College Parkway, Frederick, Maryland 1949
**Mallory, Dwight H[arcourt], 17 Sherwood St., Brockville, Ontario, Canada 1946
*Manley, C[alvert] H[amilton], 1113 Woodmont Ave., New Kensington, Pennsylvania 1946
*Manners, Edward Robert, 216 New Broadway, Brooklawn, New Jersey 1942
Manning, T. H., 37 Linden Terrace, Ottawa, Canada 1950
**Mannix, Lucille Marie (Mrs. J. R.), 11424 Cedar Rd., Apt. E 2, Cleveland, Ohio 1947
*Manville, Richard H[yde], Department of Zoology, Michigan State College, East Lansing, Michigan 1941

*Mara, Robert M[ichael], The Dearborn Inn, Dearborn, Michigan 1949
*Marfield, George R[owland], 1820 S. Olive Ave., Alhambra, California 1948
*Margolin, Abe S[tanley], Phoenix College, Phoenix, Arizona 1944
Markle, Millard S., Earlham College, Richmond, Indiana 1948
Marks, Jack Loran, 1504 S. W. Salmon St., Portland, Oregon 1949
Marsh, Miss Lillian [Irene], Tall Oaks, River Rd., Route 5, Manitowoc, Wisconsin 1949
Marshall, Dr. A. J., St. Bartholomew's Hospital Medical College, Charterhouse Square, London E. C. 1, England 1950
*Marshall, Raymond O[scar], Route 2, Columbiana, Ohio 1945
*Marshall, Terrell, 372 Skyline Dr., Park Hill, North Little Rock, Arkansas 1944
*Marshall, William H[ampton], Division of Entomology and Economic Zoology, University Farm, St. Paul 1, Minnesota 1942
Martin, Paul S[chultz], Box 532, West Chester, Pennsylvania 1946
**Marvel, Carl S[hipp], 404 W. Pennsylvania Ave., Urbana, Illinois 1949
**Maslowski, Karl H[erbert], 1034 Maycliff Place, Cincinnati 30, Ohio 1934
Mason, C[harles] N[athan] Sr., 6432 31st St., N. W., Washington 15, D. C. 1947
*Mason, Esther, 2523 Montgomery St., Louisville 12, Kentucky 1941
Mayer, Bird Wells (Mrs. John H.), 103 S. Miller St., Cynthiana, Kentucky 1948
*Mayfield, G[eorge] R[adford], Vanderbilt University, Nashville, Tennessee 1917
*Mayfield, Harold F[ord], 2557 Portsmouth Ave., Toledo 12, Ohio 1940
***Mayr, Ernst, American Museum of Natural History, 79th St. and Central Park West, New York 24, New York 1933
*Mazzeo, Rosario, 120 Elm St., North Cambridge 40, Massachusetts 1947
Meacham, Frank B., State Museum, Raleigh, North Carolina 1948
Mead, Frank Waldreth, 227 Brighton Rd., Columbus 2, Ohio 1948
**Meade, Dr. Gordon M[ontgomery], Trudeau Sanatorium, Trudeau, New York 1937
Meanley, Brooke, 4513 College Ave., College Park, Maryland 1950
Mehner, John F., 1003 James St., Pittsburgh 34, Pennsylvania 1949
**Meitzen, Logan H[erman], Star Route 2, Box 63, Anahuac, Texas 1947
Mellinger, E[nos] O[ren], Chincoteague National Wildlife Refuge, Box 62, Chincoteague, Virginia 1939
***Melone, Theodora G[ardner], Geology Library, University of Minnesota, Minneapolis 14, Minnesota 1947
*Meltvedt, Burton W., Paullina, Iowa 1930
Mendall, Howard L[ewis], 28 Pendleton St., Brewer, Maine 1936
Meng, Heinz Karl, 116 Miller St., Ithaca, New York 1943
**Mengel, Jane S[trahan] (Mrs. Robert M.), 20 East Shore Dr., Whitmore Lake, Michigan 1948
**Mengel, Robert M[orrow], 20 E. Shore Dr., Whitmore Lake, Michigan 1937
*Menninger, Phil B., 1724 Collins Ave., Topeka, Kansas 1949
*Meredith, Col. Russell Luff, % General Delivery, Augusta, Montana 1946
*Meritt, James Kirkland, 99 Battle Rd., Princeton, New Jersey 1944
***Merry, Miss Katherine, State Teachers' College, Wayne, Nebraska 1944
**Mers, W[illiam] H[enry], 1659 Marlowe Ave., Cincinnati 2, Ohio 1949
*Messner, Clarence John, 308 McKinley, Grosse Pointe 30, Michigan 1944
**Metcalf, H[omer] N[oble], Department of Horticulture, Montana State College, Bozeman, Montana 1944
**Metcalf, Zeno P[ayne], State College Station, Raleigh, North Carolina 1900
*Mewaldt, L[eonard] R[ichard], Department of Zoology, Washington State College, Pullman, Washington 1947

*Meyer, Henry, Department of Biology, Ripon College, Ripon, Wisconsin 1939
**Meyerriecks, Andrew J[oseph], Box 4251, University of Tennessee, Knoxville, Tennessee 1948
*Meyers, Dr. Kenneth Lewis, 2601 Far Hills Ave., Dayton 9, Ohio 1949
Michaud, Howard H[enry], 824 N. Chauncey St., West Lafayette, Indiana 1938
Michaux, Joy Houston (Mrs. Frank W.), 1607 Bluff St., Wichita Falls, Texas 1947
Michener, Mrs. Harold, 418 N. Hudson Ave., Pasadena 4, California 1950
Mickey, Arthur B[ayard], 1516 Rainbow Ave., Laramie, Wyoming 1935
Middleton, Douglas S[arsfield], 7443 Buhr Ave., Detroit 12, Michigan 1946
*Middleton, Mary Elizabeth (Mrs. Archie D.), Brady, Nebraska 1948
*Mikkelson, Edyth A. (Mrs. Herbert G.), 4200 Chicago Ave., Minneapolis 7, Minnesota 1948
Miles, Eleanor Burgess (Mrs. Philip E.), 1900 Arlington Place, Madison 5, Wisconsin 1943
*Miller, Alden H[olmes], Museum of Vertebrate Zoology, University of California, Berkeley 4, California 1930
Miller, Mrs. Alice, 4600 Firestone Ave., Terrace 7, Dearborn, Michigan 1944
Miller, Mrs. Clarence Heath, 1354 Herschel Ave., Cincinnati 8, Ohio 1941
***Miller, Douglas Scott, 122 Lawrence Ave., E., Toronto, Ontario, Canada 1939
Miller, Mrs. Helen Burns, Spring Gap, Maryland 1950
Miller, J[ames] Robert, 137 Haven Rd., University Heights, Syracuse 10, New York 1946
Miller, Jerome Stapleton, 1338 Washtenaw Ave., Ann Arbor, Michigan 1949
*Miller, Loye H[olmes], University of California, 405 Hilgard Ave., Los Angeles 24, California 1939
*Miller, Lyle [DeVerne], 650 Almyra Ave., Youngstown, Ohio 1947
Miller, Richard W., 113 W. 8th St., Cambridge, Ohio 1948
Miller, William R[osewarne], Fish and Game Service, Route 1, Milton, Vermont 1946
Mills, Robert H[enry], 511 Allen St., Bryan, Ohio 1941
*Milnes, Miss Hattie K[ernahan], 331 Gowen Ave., Mt. Airy, Philadelphia 19, Pennsylvania 1935
*Minard, Elbridge Alden, 25 Maple St., Auburndale 66, Massachusetts 1950
Miner, Miss Edna Wolf, 2206 Brun Ave., Houston 19, Texas 1947
*Minich, Edward C., 1047 Fairview Ave., Youngstown 2, Ohio 1923
Minnick, Wilbur Shaffer, Conley Rd., Route 3, Painesville, Ohio 1949
Miskimen, Miss Mildred, Dept. of Zoology, Ohio State University, Columbus 10, Ohio 1950
*Mitchell, Harold Dies, 378 Crescent Ave., Buffalo 14, New York 1936
**Mitchell, Mrs. Osborne, Brazilian Traction, 25 King St. W., Toronto, Ontario, Canada 1933
**Mitchell, Mrs. R. V., Wade Park Manor, East 107th St., Cleveland 6, Ohio 1943
*Mitchell, Miss Verna E., 1900 F St., N. W., Washington 6, D. C. 1949
**Mitchell, Dr. Walton I[ungerich], 398 Vassar Ave., Berkeley 8, California 1893
Mockford, Edward [Lee], 4140 Graceland Ave., Indianapolis 8, Indiana 1946
*Moe, Miss Jean G., Flora Stone Mather College, W. R. U., Cleveland 6, Ohio 1950
Mohler, Levi L[app], 1000 S. 35th St., Lincoln 8, Nebraska 1942
*Mohr, Charles E[dward], Audubon Nature Center, Greenwich, Connecticut 1947
*Monk, Harry C[rawford], 406 Avoca St., Nashville 5, Tennessee 1920
***Monroe, Burt L[eavelle], Ridge Rd., Anchorage, Kentucky 1935
*Monroe, Burt L[eavelle] Jr., Ridge Rd., Anchorage, Kentucky 1946
*Monson, Gale, Box 1717, Parker, Arizona 1933

*Moore, Miss Dora, French Creek, West Virginia. 1934
*Moore, Mrs. Margaret Rodes, 335 W. Lexington St., Danville, Kentucky. 1949
Moore, Robert B[yron], 3434 Hollywood Dr., Baton Rouge 5, Louisiana. 1947
***Moore, Robert Thomas, Meadow Grove Place, Flintridge, Pasadena 2, California. . 1939
*Moran, James Vincent, 50 Seaverns Ave., Jamaica Plain 30, Massachusetts. 1943
*Moreno, Abelardo, Museo Poey, Cátedra "U", Escuela de Ciencias, University of Havana, Havana, Cuba. 1949
Morrell, Charles K., 119 E. Maxwell St., Lexington, Kentucky. 1943
*Morrell, Miss Elise, 1311 White Ave., Knoxville 16, Tennessee. 1942
Morrison, Kenneth Douglas, National Audubon Society, 1000 Fifth Ave., New York 28, New York. 1950
*Morrissey, Thomas J[ustin], 325 McClellan Blvd., Davenport, Iowa. 1946
*Morrow, Dessie Powers (Mrs. John Jr.), 1320 N. State St., Chicago 10, Illinois. . . . 1949
*Morse, John Salls, Sanbornton, New Hampshire. 1947
**Morse, Miss Margarette Elthea, 122 W. South S., Viroqua, Wisconsin. 1921
*Morton, Duryea, 135 Park Ave., Greenwich, Connecticut. 1947
Morton, Miss Thelma [Pauline], 1300 Burch Ave., N.W., Cedar Rapids, Iowa. . . . 1947
Mosby, Henry S., Virginia Cooperative Wildlife Research Unit, Blacksburg, Virginia. 1950
Moser, Dr. Howard Franklin, 315 Cresswell St., Ridley Park, Pennsylvania. . . . 1949
*Moser, Jane Myers (Mrs. R. Allyn), Route 1, Benson Station, Omaha 4, Nebraska. 1946
*Moser, Randolph, 470 E. Washington St., Apt. D., Pasadena 6, California. 1944
**Moser, Dr. R[euben] Allyn, Route 1, Benson Station, Omaha 4, Nebraska. 1940
*Mossman, Dr. H[arland] W[infield], 2902 Columbia Rd., Madison 5, Wisconsin. . 1948
*Mott, Peter Rhoades, Lawrencevile, New Jersey. 1949
Moule, John W[illiam], 68 North Oval St., Hamilton, Ontario, Canada. 1948
Muckley, Marion (Mrs. R. L.), 73 E. Elm St., Chicago 11, Illinois. 1950
**Mudge, Edmund W. Jr., 5926 Averill Way, Dallas, Texas. 1939
*Mueller, Helmut Charles, 2756 N. Palmer St., Milwaukee 12, Wisconsin. 1949
*Mumford, Russell E[ugene], Box 22, Mt. Vernon, Indiana. 1949
*Munter, Rear Admiral W[illiam] H[enry], (Retired), 4518 52nd Ave., N. E., Seattle 5, Washington. 1933
Murdock, James Ingram, 311 Irving Ave., Glendale 1, California. 1940
*Murie, Adolph, McKinley Park, Alaska. 1932
*Murie, O[laus] J., Moose, Wyoming. 1934
*Murphey, Eugene Edmund, 432 Telfair St., Augusta, Georgia. 1935
*Murphy, Paul C[harles], 935 Goodrich Ave., Apt. 10, St. Paul 5, Minnesota. 1944
Murray, Rev. J[oseph] J[ames], 6 White St., Lexington, Virginia. 1931
Murray, Miss Gladys M., 5 California Apts., Charleston 1, West Virginia. 1950
*Musgrove, Jack W[arren], 2414 Adams Ave., Des Moines 10, Iowa. 1947
Musselman, T[homas] E[dgar], 124 South 24th St., Quincy, Illinois. 1940
Myers, Buford M[acMartin] Jr., 2609 Calhoun St., New Orleans 15, Louisiana. . . . 1948
Myers, Milton Merle, 135 Cambridge Ave., Dayton 6, Ohio. 1949
Myers, Robert Hamilton, 311 E. Main St., Frankfort, Kentucky. 1950
Nauert, Miss Erna, 7351 Sharp Ave., St. Louis 16, Missouri. 1948
Neal, Dorothy Phillips (Mrs. Charles), Box 133, Demorest, Georgia. 1946
*Neff, Johnson Andrew, 546 Custom House, Denver, Colorado. 1920
*Nelson, Arnold Lars, 3256 Van Hazen St., N. W., Washington 15, D. C. 1932
*Nelson, Charles E[llsworth] Jr., 124 Oxford Rd., Waukesha, Wisconsin. 1937

Nelson, Detlof B[ennett], 269 E. 140th Place, Dalton, Illinois 1947
Nelson, S. Page, McDonogh, Maryland 1950
***Nelson, Theodora, 315 East 68th St., New York 21, New York 1928
Nelson, T. W., 432 Jewell Ave., Topeka, Kansas 1949
Nelson, Urban C., Box 1887, Juneau, Alaska 1939
Nero, Robert William, Department of Zoology, University of Wisconsin, Madison 6, Wisconsin 1947
*Nessle, James P., 1823 Barrows St., Toledo 13, Ohio 1936
Netting, M[orris] Graham, Carnegie Museum, Pittsburgh 13, Pennsylvania 1941
Nevius, Mrs. Richard, Route 1, Greeneville, Tennessee 1940
*New, John, 340 W. 86th St., New York 24, New York 1946
*Newman, Robert J[ames], Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana 1950
*Nice, L[eonard] B., 5725 Harper Ave., Chicago 37, Illinois 1932
***Nice, Mrs. Margaret Morse, 5725 Harper Ave., Chicago 37, Illinois 1921
**Nichols, Charles K[etcham], 212 Hamilton Rd., Ridgewood, New Jersey 1933
*Nichols, John Treadwell, American Museum of Natural History, 79th St. and Central Park W., New York 24, New York 1941
*Nichols, L[eon] Nelson, 331 E. 71st St., New York, New York 1937
Nicholson, Donald John, 1224 Palmer St., Orlando, Florida 1945
*Nickell, Walter Prine, Cranbrook Institute of Science, Bloomfield Hills, Michigan 1943
Nieland, Carol G., Biology Bldg., University of Wisconsin, Madison 6, Wisconsin 1949
Nields, James F. Jr., Hardwick, Massachusetts 1950
**Nielsen, Beatrice Wise (Mrs. G. W.), 149 Ridgecrest Ave., Los Gatos, California 1945
Niemann, Philip George, 4873 Underwood, Detroit 4, Michigan 1950
Niess, William Victor, 2343 Hickory St., St. Louis 4, Missouri 1950
*Nighswanger, Paul F., Route 9, Alva, Oklahoma 1950
*Nordquist, Theodore C., 2701 York Ave. N., Robbinsdale 22, Minnesota 1941
Noren, Oscar B., 17015 Kinlock, Detroit 19, Michigan 1945
*Nork, Theodore J., 451 Wrightwood Ave., Chicago 14, Illinois 1947
Norman, James L[ee], Department of Zoology, University of Oklahoma, Norman, Oklahoma 1948
*Norris, Frank G[iles], Route 3, Steubenville, Ohio 1946
Norris, Robert Allen, Museum of Vertebrate Zoology, University of California, Berkeley 4, California 1941
Norris, Russell T[aplin], 50 Milk St., Newburyport, Massachusetts 1939
*Norse, William J[ohn], 531 W. 211th St., New York 34, New York 1939
*North, George W[ebster], 249 Charlton Ave., W., Hamilton, Ontario, Canada 1941
*Northrop, Myron, % A. S. Aloe Company, 1831 Olive St., St. Louis 3, Missouri 1945
***Nowland, Paul J., 700 Equitable Bldg., Wilmington, Delaware 1950
Nunnemacher, Gertrude A. (Mrs. H. J.), 2815 E. Newberry Blvd., Milwaukee 11, Wisconsin 1950
*Oberholser, Harry Church, 2933 Berkshire Rd., Cleveland Heights, Cleveland 18, Ohio 1894
*O'Conner, Esther [Laura], 4344 Locust Ave., Kansas City 4, Missouri 1940
*Odum, Eugene P[leasants], Department of Zoology, University of Georgia, Athens, Georgia 1930
Odum, Howard Thomas, Osborn Zoological Laboratory, Yale University, New Haven, Connecticut 1946

Oliver, Mary C[lara], Box 406, Silver City, New Mexico 1934
*Olsen, James H[arold], Box 11, Worthington, Ohio 1947
**Olsen, Dr. Richard E., 3325 Franklin Rd., Route 3, Pontiac, Michigan 1938
**Olson, Gladys E[lizabeth] (Mrs. Simon), 1115 Homewood Dr., Lakewood 7, Ohio .. 1942
Olson, Mrs. Monrad J., Box 145, Sanish, North Dakota 1946
Ommanney, G. G., P.O. Box 14, Hudson Heights, Quebec, Canada 1944
Omoto, Jean H[ideko], 6040 Woodlawn Ave., Chicago 37, Illinois 1949
*O'Neil, Norah Selby (Mrs. Mike), 1311 Bonham St., Commerce, Texas 1949
**O'Reilly, Ralph A. Jr., Davisburg, Michigan 1936
*Oresmen, Stephen B[ergel], 115 Central Park West, New York 23, New York 1949
Orians, Rev. Howard Lester, 1611 16th Ave., Monroe, Wisconsin 1947
Österlöf, Sten, Näsby Alle 14, Näsbypark, Sweden 1950
Ott, Louis Frederick, 2527 N. Wahl Ave., Milwaukee 11, Wisconsin 1941
*Overing, Robert, Route 4, Raleigh, North Carolina 1930
Owen, Oliver S., Laboratory of Ornithology, Fernow Hall, Cornell University, Ithaca, New York 1948
*Owre, Oscar T., 2625 Newton Ave., S., Minneapolis 5, Minnesota 1935
*Packard, Fred Mallory, 1214 16th St., N. W., Washington 6, D. C. 1949
*Palmer, Ralph S[imon], New York State Museum, State Education Bldg., Albany 1, New York 1934
*Palmer, T[heodore] S[herman], 1939 Biltmore St., N. W., Washington, D. C. 1914
**Palmquist, Clarence O[scar], 7400 N. Odell Ave., Chicago 31, Illinois 1945
*Pangborn, Mark W[hite], 125 E. 49th St., Indianapolis, Indiana 1948
Parker, Clarence J[oseph], 821 N. Garfield Ave., Alhambra, California 1948
*Parker, Henry M[elville], 86 Buckingham St., Apt. 24, Cambridge, Massachusetts .. 1941
**Parkes, Kenneth Carroll, Laboratory of Ornithology, Fernow Hall, Cornell University, Ithaca, New York 1946
Parks, G. Hapgood, 99 Warrenton Ave., Hartford 5, Connecticut 1950
*Parks, Richard Anthony, 2303 Pembrook Pl., N. E., Atlanta, Georgia 1942
Parmelee, David F[reeland], 533 Harding Ave., Iron Mountain, Michigan 1949
*Partch, Max L[orenzo], 1536 11th Ave., S. E., St. Cloud, Minnesota 1940
Paterson, James Bruce, 111 The Maples, Fox Chapel, Pittsburgh 15, Pennsylvania 1950
*Paul, Mrs. Harold Gilmore, 84 N. Stanwood Rd., Columbus 9, Ohio 1948
Paulson, Clarence, Seneca, Wisconsin 1949
Paynter, R[aymond] A[ndrew] Jr., 208 Forest Hill Rd., Hamden 14, Connecticut .. 1946
Pederson, Donald P[enhallegon], 43 E. Lattimore Rd., Rochester, New York 1948
Peelle, Miles L., 1039 College St., Adrian, Michigan 1940
Penner, Lawrence R., Department of Zoology and Entomology, University of Connecticut, Storrs, Connecticut 1940
Perkins, Mrs. Mary Loomis, 1305 S. 52nd St., Omaha 6, Nebraska 1946
*Perner, Margaret E., 2487 Noble Rd., Apt. 23 B, Cleveland Heights 21, Ohio 1943
Perry, William L[ouis], Newport, Florida 1949
Peters, Ellen, 442 5th St., Brooklyn 15, New York 1942
Peters, Harold S[eymour], 968 Cumberland Rd., N. E., Atlanta 6, Georgia 1924
*Peterson, Alfred, Box 201, Brandt, South Dakota 1931
Peterson, Arnold J[erome], 3628 Gregory St., Madison, Wisconsin 1949
*Peterson, Mrs. C[harles] E[mil], Madison, Minnesota 1936
Peterson, Randolph L., Division of Mammals, Royal Ontario Museum of Zoology, Toronto 5, Ontario, Canada 1946
***Peterson, Roger Tory, Box 7, Glen Echo, Maryland 1942

*Petrides, George A., Division of Conservation, Michigan State College, East Lansing, Michigan ... 1942
**Petroskey, Helen Martha, Box 91, Hiram, Ohio ... 1949
***Pettingill, Olin Sewall Jr., Carleton College, Northfield, Minnesota ... 1930
*Pettit, Lincoln C[oles], Hiram, Ohio ... 1948
***Phelps, William H[enry], Apartado 2009, Caracas, Venezuela ... 1940
***Phillips, Allan Robert, 113 Olive Rd., Tucson, Arizona ... 1934
**Phillips, Cyrus Eastman II, 255 Polk St., Warsaw, Illinois ... 1944
*Phillips, Homer Wayne, 1418 A, Brackenridge Apts., Austin, Texas ... 1947
Phillips, Richard Stuart, 834 Liberty St., Findlay, Ohio ... 1944
*Phillips, William W., Box 153, Doniphan, Missouri ... 1949
*Pickett, Merle N[aomi], Tall Oaks, River Rd., Manitowoc, Wisconsin ... 1949
Pierce, Fred J[ohn], Winthrop, Iowa ... 1947
*Pierce, Robert Allen, Barlow, Mississippi ... 1941
*Pinney, Mary Edith, Wilson, Kansas ... 1948
*Pirnie, Miles David, Conservation Institute, Michigan State College, East Lansing, Michigan ... 1928
*Pitelka, Frank Alois, Museum of Vertebrate Zoology, University of California, Berkeley 4, California ... 1938
Pittinger, Mrs. Cornelia Milhollin, Route 2, Gaston, Indiana ... 1947
**Pittman, James Allen Jr., 421 East Concord, Orlando, Florida ... 1945
*Plaisted, Walter William, 95 Newcomb Rd., Tenafly, New Jersey ... 1949
Plath, Karl, 305 S. Cuyler Ave., Oak Park, Illinois ... 1942
*Platt, Dr. Ruth M[ontague], 441 Lyceum Ave., Philadelphia 28, Pennsylvania ... 1948
Pomeroy, Lawrence R., Box 212, Pass-a-Grille Beach, Florida ... 1948
**Poole, Cecil A[very], 1764 Topeka Ave., San Jose 11, California ... 1942
Poor, Hustace Hubbard, 230 E. 71st., New York 21, New York ... 1935
**Porter, Dr. Eliot F[urness], Route 1, Box 5B, Sante Fe, New Mexico ... 1947
Porter, Richard D., 3130 Ogden Ave., Ogden, Utah ... 1950
*Porter, T[homas] Wayne, Department of Zoology, Michigan State College, East Lansing, Michigan ... 1938
*Potter, David M., 1557 Timothy Dwight College, Yale University, New Haven 11, Connecticut ... 1946
Potter, Beatrice B[rown] (Mrs. George C.), 2111 Malvern Rd., Charlotte 7, North Carolina ... 1948
Potter, Julian K[ent], 437 Park Ave., Collingswood, New Jersey ... 1915
Potter, Louis Henry, Route 2, West Rutland, Vermont ... 1941
***Pough, Richard H[ooper], 33 Highbrook Ave., Pelham 65, New York ... 1938
Prather, Millard F[illmore], 1129 Brown-Marx Building, Birmingham 3, Alabama ... 1940
Prescott, Kenneth Wade, Museum of Zoology, University of Michigan, Ann Arbor, Michigan ... 1946
*Preston, Frank W[illiam], Box 149, Butler, Pennsylvania ... 1948
*Prill, Albert G., Main St., Scio, Oregon ... 1921
*Prucha, Alma H., 1716 N. Prospect Ave., Milwaukee 2, Wisconsin ... 1942
Puckette, Mrs. Charles, Box 291, Heavener, Oklahoma ... 1950
Puett, May Wilson, Box 2183, Greenville, South Carolina ... 1950
*Putnam, William L[loyd], Dominion Entomological Laboratory, Vineland Station, Ontario, Canada ... 1945
Putnam, Loren Smith, Department of Zoology, Ohio State University, Columbus 10, Ohio ... 1942
Quam, Mrs. Mary Battell, Box 716, Paoli, Pennsylvania ... 1944

Quay, Thomas L., Zoology Department, North Carolina State College, Raleigh, North Carolina ... 1939
*Quay, W[ilbur] B[rooks], Locustville, Virginia ... 1949
Quimby, Don C., Department of Zoology and Entomology, Montana State College, Bozeman, Montana ... 1942
*Ragusin, Anthony V[incent], Box 496, Biloxi, Mississippi ... 1937
Rahe, Carl W., 9005 Tioga Ave., Cleveland 5, Ohio ... 1931
*Ramey, Ralph E[merson] Jr., 174 S. Ardmore Rd., Columbus 9, Ohio ... 1948
*Ramisch, Miss Marjorie [Viola], 1835 Noble Rd., East Cleveland 12, Ohio ... 1943
*Ramsay, A[lfred] Ogden, McDonogh School, McDonogh, Maryland ... 1949
Ramsden, Charles Theodore, 8 and 19, Vista Alegre, Santiago, Cuba ... 1914
Rand, Austin L., Chicago Natural History Museum, Chicago 5, Illinois ... 1950
**Randall, Clarence B[elden], 38 S. Dearborn St., Chicago, Illinois ... 1949
Randall, Robert Neal, 117½ Fifth St., Bismarck, North Dakota ... 1939
Randle, Worth S., 3614 Shaw Ave., Cincinnati 8, Ohio ... 1949
Rapp, Robert R[umsey], 34 Main St., Ridgefield, Connecticut ... 1948
Rapp, William F[rederick] Jr., Gaylord Hall, Doane College, Crete, Nebraska ... 1941
*Rausch, Robert [Lloyd], United States Public Health Service, Box 960, Anchorage, Alaska ... 1947
*Rawson, George William, CIBA Pharmaceutical Products, Inc., Lafayette Park, Summit, New Jersey ... 1947
*Rea, Gene, 251 Leland Ave., Columbus 2, Ohio ... 1948
*Read, Bayard W[hitney], Upper Dogwood Lane, Rye, New York ... 1949
**Rebmann, G. Ruhland Jr., 729 Millbrook Lane, Haverford, Pennsylvania ... 1941
Reed, Parker Crosby, 27 Hayes Ave., Lexington, Massachusetts ... 1949
*Reeder, Miss Clara Maude, 1608 College Ave., Houghton, Michigan ... 1938
Rees, Earl Douglas, 1504 N. Main St., Findlay, Ohio ... 1946
Reese, C[arl] R[ichard], 266 East Dunedin Rd., Columbus 2, Ohio ... 1948
**Reese, Teresa S. (Mrs. Hans H.), 3421 Circle Close, Shorewood Hills, Madison 5, Wisconsin ... 1941
Reeve, Alexander Jardine, 276 Renfrew St., Winnipeg, Manitoba, Canada ... 1950
**Rehfisch, Miss Carol, 562 Arlington Ave., Berkeley 7, California ... 1949
*Reilly, E[dgar] M[ilton] Jr., 305 East Veterans Place, Ithaca, New York ... 1946
Remington, Charles L[ee], Osborn Zoological Laboratory, Yale University, New Haven 11, Connecticut ... 1944
*Renn, Miss Elmira Virginia, 2010 38th St., S. E., Washington 20, D. C. ... 1949
*Rett, Egmont Z[achary], Museum of Natural History, Santa Barbara, California ... 1940
*Reuss, Alfred Henry Jr., 2908 Edison St., Blue Island, Illinois ... 1936
*Reynard, George B., 728 Parry Ave., Palmyra, New Jersey ... 1950
*Reynolds, Mrs. Perry J, 1652 Virginia Park, Detroit 6, Michigan ... 1948
*Reynolds, William Pius, 1330 Foulkrod St., Philadelphia 24, Pennsylvania ... 1948
Rice, Dale [Warren], 432 W. 42nd St., Indianapolis 8, Indiana ... 1946
Rice, Mrs. Harry Wilson, 3940 Richfield Rd., Minneapolis 10, Minnesota ... 1940
Richdale, Lancelot Eric, 23 Skibo St., Kew, Dunedin SW1, New Zealand ... 1945
Richter, Carl H., 703 Main St., Oconto, Wisconsin ... 1947
*Ricker W[illiam] E[dwin], Pacific Biological Station, Nanaimo, British Columbia, Canada ... 1943
*Riggs, Carl D[aniel], Department of Zoology, University of Oklahoma, Norman, Oklahoma ... 1943
*Ripley, Sidney Dillon II, Litchfield, Connecticut ... 1946
*Ritchie, Dr. Robert C., 611 Woburn Ave., Toronto 12, Ontario, Canada ... 1944

*Robbins, Chandler S[eymour], Patuxent Research Refuge, Laurel, Maryland.... 1941
***Robbins, Eleanor C[ooley] (Mrs. Chandler S.), Patuxent Research Refuge, Laurel, Maryland.... 1936
Roberts, Harold D., 610 Harrison St., Black River Falls, Wisconsin.... 1946
Robins, C[harles] Richard, 3300 N. Third St., Harrisburg, Pennsylvania.... 1949
Roby, Edwin F[orrest], 427 North Tracy Ave., Bozeman, Montana.... 1948
Roesler, Carol S. (Mrs. M. Stuart), June Rd., Cos Cob, Connecticut.... 1949
Roesler, M. Stuart, June Rd., Cos Cob, Connecticut.... 1949
***Rogers, Charles Henry, East Guyot Hall, Princeton, New Jersey.... 1903
***Rogers, Mabel T., 203 N. Columbia St., Milledgeville, Georgia.... 1947
*Rogers, Mrs. Walter E., Box 385, Appleton, Wisconsin.... 1931
Rogge, Charles Henry, 207 S. Euclid Ave., Sioux Falls, South Dakota.... 1950
Rooney, James P., 1514 S. 12th Ave., Yakima, Washington.... 1947
***Root, Oscar M[itchell], Brooks School, North Andover, Massachusetts.... 1940
*Rorimer, Irene Tuck (Mrs. J. M.), 28 Outer Dr., Oak Ridge, Tennessee.... 1938
*Rose, Dr. W[illiam] C[umming], 710 W. Florida Ave., Urbana, Illinois.... 1949
Rosene, Walter Jr., 1212 Jupiter, Gadsden, Alabama.... 1942
*Rosewall, O[scar] W[aldemar], Department of Zoology, Louisiana State University, Baton Rouge, Louisiana.... 1931
*Ross, C[harles] Chandler, 7924 Lincoln Dr., Chestnut Hill, Philadelphia 18, Pennsylvania.... 1937
Ross, James B., Department of Biological Sciences, University of Pittsburgh, Pittsburgh 13, Pennsylvania.... 1949
Routa, Albert, 331½ E. Main St., Clarksburg, West Virginia.... 1950
***Rudd, Clayton G[lass], 315 Medical Arts Bldg., Minneapolis 2, Minnesota.... 1944
Ruecker, Miss Emilie, Seapowet Ave., Tiverton, Rhode Island.... 1943
Ruhr, C[lifford] E[ugene], 1007 Laurel St., Atlantic, Iowa.... 1947
Rutter, Russell James, Huntsville, Ontario, Canada.... 1950
Ryan, Richard, 5009 Broadway, New York 34, New York.... 1949
Sabin, Walton B., 122 Sims Rd., Syracuse 10, New York.... 1945
Sait, Carroll C[harles], 4134 Old Orchard Ave., Montreal 28, Quebec, Canada.... 1949
*Samsell, Theodore R., 438 Wilson St., Elkins, West Virginia.... 1949
*Sanders, Earl, 1808 Vincent St., Brownwood, Texas.... 1949
Sandy, Tirzah M., University Hospital, Baltimore 1, Maryland.... 1950
*Satterly, J[ack], 100 Castlewood Rd., Toronto 12, Ontario, Canada.... 1947
*Satterthwait, Mrs. Elizabeth Allen, 806 W. Ohio St., Urbana, Illinois.... 1925
Sauer, Dr. Gordon C[henoweth], 448 E. 20th St., New York 9, New York.... 1949
*Saugstad, N[els] Stanley, Route 4, Minot, North Dakota.... 1939
*Saunders, Aretas A[ndrews], Box 141, Canaan, Connecticut.... 1934
*Saunders, George B[radford], Fish and Wildlife Service, 546 Custom House, Denver 2, Colorado.... 1926
Saunders, Richard Merrill, 9 McMaster Ave., Toronto 5, Ontario, Canada.... 1948
***Savage, James, Buffalo Athletic Club, Buffalo, New York.... 1939
*Sawyer, Miss Dorothy, 1656 Bradley St., Schenectady 4, New York.... 1937
Schaeffer, David A[lan], 405 Pine St., West Reading, Pennsylvania.... 1949
Schaub, Mary Hall (Mrs. J. B.), 1040 Isabella St., Wilmette, Illinois.... 1939
*Schneider, Miss Evelyn J., 2207 Alta Ave., Louisville 5, Kentucky.... 1935
Scholes, Mrs. Doris Kathryn, 385 E. Hall St., Bushnell, Illinois.... 1947
Scholes, Robert T[hornton], 260 Crittenden Blvd., Box 243, Rochester 7, New York.... 1946
Schoonover, Lyle James, Chautauqua Refuge, Havana, Illinois.... 1950

***Schorger, A[rlie] W[illiam], 168 N. Prospect Ave., Madison, Wisconsin. 1927
**Schramm, Wilson [Cresap], 321 Kensington Rd., Syracuse 10, New York. 1944
*Schreiner, Keith M., Ollie, Iowa. 1949
Schumm, William George, 302 C St., LaPorte, Indiana. 1944
Schwartz, Charles Walsh, 131 Forest Hill, Jefferson City, Missouri. 1950
Schwendener, Mrs. Carl M., 1722 N. 48th St., Milwaukee 8, Wisconsin. 1949
*Scotland, Dr. Minnie B[rink], 42 Continental Ave., Cohoes, New York. 1938
*Scott, Mrs. Dorothy Dean, 1508 La Loma Ave., Berkeley 8, California. 1948
Scott, D. M., Department of Zoology, McGill University, Montreal 2, Quebec, Canada. 1950
Scott, Fred T., Pittsburg, New Hampshire. 1948
*Scott, Frederic R[obert], 4600 Coventry Rd., Richmond 21, Virginia. 1947
**Scott, Peter, The New Grounds, Slimbridge, Gloucestershire, England. 1947
Scott, Thomas G[eorge], Section of Game Research and Management, Illinois Natural History Survey, Urbana, Illinois. 1936
*Scott, W[alter] E[dwin], Mendota Beach Heights, Madison 5, Wisconsin. 1938
Sealander, John A[rthur] Jr., Department of Zoology, University of Arkansas, Fayetteville, Arkansas. 1947
Seaman, George Albert, Box 147, St. Thomas, Virgin Islands. 1950
**Sedwitz, Walter W[illiam], 229 W. 36th St., New York 18, New York. 1947
Seeber, Edward L[incoln], 186 Wabash Ave., Kenmore 17, New York. 1944
*Seibert, Henri C., Ohio University, Athens, Ohio. 1941
**Sener, Miss Ruth, 233 Charlotte St., Lancaster, Pennsylvania. 1943
Serbousek, Lillian, 1226 Second St., SW, Cedar Rapids, Iowa. 1935
**Shackleton, Elizabeth C[atterall] (Mrs. Walter H.), Route 1, Box 76 A, Prospect, Kentucky. 1947
**Shackleton, Walter H., Route 1, Box 76 A, Prospect, Kentucky. 1947
*Shaffer, Chester M[onroe], Eagle Lake, Florida. 1934
*Shaftesbury, Archie D., Women's College, University of North Carolina, Greensboro, North Carolina. 1930
Shannon, Bernice [Irene] B[eladean] (Mrs. Francis P.), 504 W. Ormsby St., Louisville 3, Kentucky. 1949
Sharp, Ward M., Pennsylvania State College, 206 Forestry Bldg., State College, Pennsylvania. 1936
Shaub, Benjamin Martin, 159 Elm St., Northampton, Massachusetts. 1948
Shaver, Jesse M[ilton], George Peabody Teachers' College, Nashville, Tennessee. . 1922
Shaw, Dr. Charles H[icks], Bremen, Ohio. 1941
**Shearer, A[mon] R[obert], Box 428, Mount Belvieu, Chambers Co., Texas. 1893
*Shelford, Victor E[rnest], University of Illinois, Vivarium Bldg., Champaign, Illinois. 1931
Shetler, Stanwyn G[erald], Route 2, Hollsopple, Pennsylvania. 1949
Short, Wayne, National Audubon Society, 1000 Fifth Ave., New York 28, New York. 1941
Shuman, Miss Bertha C., 136 S. 19th St., LaCrosse, Wisconsin. 1947
*Sibley, Charles G[ald], Department of Natural Sciences, San Jose State College, San Jose 14, California. 1942
Sieh, James G[erald], State Fish Hatchery, Spirit Lake, Iowa. 1948
*Siess, L. Colette, 129 Poplar Ave., Hackensack, New Jersey. 1950
**Simmons, Mrs. Amelia C., 2742 N. Maryland Ave., Milwaukee 11, Wisconsin. . . . 1943
***Simmons, Edward McIlhenny, Avery Island, Louisiana. 1942

***Simmons, Grant Gilbert Jr., Lake Ave., Greenwich, Connecticut 1949
*Simon, James R., Jackson Hole Wildlife Park, Moran, Wyoming 1947
Simon, Stephen Wistar, 7727 York Rd., Towson 4, Maryland 1947
*Simpson, Mrs. Roxie Collie, 6624 First St., N.W., Washington 12, D. C. 1949
Sims, Harold L[ee], 714 St. Philip St., Thibodaux, Louisiana 1942
*Singleton, Albert Roland, 3968 Marburg Ave., Cincinnati 9, Ohio 1948
Sjodahl, Sven Erik, 7013 Noble Ave., Cincinnati 24, Ohio 1949
Skaggs, Merit B[ryan], Eagle and Dodds Rds., Route 1, Willoughby, Ohio 1934
Skelton, Mrs. Kathleen, 353 W. 57th St., New York, New York 1949
*Slack, Miss Mabel, 1004 Everett Ave., Louisville 4, Kentucky 1934
Slud, Paul B., Box 122, Kiamesha Lake, New York 1950
Smalley, Alfred E[vans], Open Hearth, Lewistown, Pennsylvania 1946
*Smith, Dr. A[rthur] F[rancis], Manning, Iowa 1934
*Smith, Allen G[ordon], Box 603, Brigham City, Utah 1949
Smith, Carl E[rnest], Halsey, Nebraska 1947
Smith, Earl E[mmett], Harvard Forest, Petersham, Massachusetts 1947
Smith, Miss Emily, Route 1, Box 387, Los Gatos, California 1948
*Smith, Frank R[ush], Route 2, Box 100, Laurel, Maryland 1910
*Smith, Harry M[adison], Department of Zoology and Physiology, University of Wyoming, Laramie, Wyoming 1936
Smith, Miss Marion L[ucille], 429 S. Willard St., Burlington, Vermont 1949
Smith, Orion O., Box 150 A, Spring Creek Rd., Rockford, Illinois 1936
Smith, Richard Huston, 811 S. Willson St., Bozeman, Montana 1949
*Smith, Robert L[eo], Route 1, Reynoldsville, Pennsylvania 1945
Smith, Robert Skalak, 12904 Melgrove Ave., Garfield Heights, Ohio 1950
*Smith, Roy Harmon, 183 N. Prospect St., Kent, Ohio 1936
Smith, Wendell Phillips, Wells River, Vermont 1921
Smith, Winnifred Wahls (Mrs. E. R.), Winghaven, Route 1, Two Rivers, Wisconsin 1946
Snapp, Mrs. R. R., 310 W. Michigan, Urbana, Illinois 1940
Snow, Mabelle (Mrs. C. S.), 2211 Chester Blvd., Richmond, Indiana 1950
Snyder, Dana Paul, Museum of Zoology, University of Michigan, Ann Arbor, Michigan 1949
*Snyder, L[ester] L[ynne], Royal Ontario Museum of Zoology, Queen's Park at Bloor St., Toronto 5, Ontario, Canada 1929
Sooter, Clarence Andrew, 1156 E. 78th St., Kansas City 5, Missouri 1940
Sorrells, Curtis Cooper, 2308 10th Ave., S., Nashville 4, Tennessee 1950
***Sorrill, Anna Marie (Mrs. Tom), Tom Sorrill Farm, Ursa, Illinois 1950
Sowls, Lyle K[enneth], Delta Waterfowl Research Station, Delta, Manitoba, Canada 1949
Spangler, Miss Iva M., 128 E. Foster Parkway, Fort Wayne, Indiana 1939
*Speirs, Doris Huestis (Mrs. J. M.), "Cobble Hill", Route 2, Pickering, Ontario, Canada 1936
Speirs, J[ohn] Murray, "Cobble Hill," Route 2, Pickering, Ontario, Canada 1931
Spencer, Haven Hadley, 4961 Packard Road, Ypsilanti, Michigan 1946
***Spencer, O[live] Ruth, 1030-25 Avenue Court, Moline, Illinois 1938
Sperry, Charles Carlisle, 1455 S. Franklin St., Denver 10, Colorado 1931
Spofford, Walter R[ichard] II, Department of Anatomy, Syracuse Medical College, Syracuse, New York 1942
Springer, Paul F[rederick], Patuxent Research Refuge, Laurel, Maryland 1946

*Stabler, Robert M[iller], Colorado College, Colorado Springs, Colorado. 1939
*Staebler, Arthur E[ugene], W. K. Kellogg Bird Sanctuary, Route 1, Augusta, Michigan 1937
**Stahl, Miss Marjoretta Jean, Kimberly, West Virginia. 1942
*Stamm, Anne L. (Mrs. Frederick W.), 2118 Lakeside Dr., Louisvile 5, Kentucky. . 1947
Stark, Miss Wilma R[uth], Meridian Hill Hotel, 16th St., N. W., Washington, D. C. 1939
Starrett, William C[harles], Illinois State Natural History Survey, Route 2, Havana, Illinois 1933
Stauffer, James Milton, 4452 33rd Ave., S., Minneapolis 6, Minnesota. 1949
*Stauffer, Ralph Stanley, 170 W. Washington St., Hagerstown, Maryland. 1949
Stearns, Edwin I[ra] Jr., 928 Grant Ave., Plainfield, New Jersey. 1945
*Steele, William Soles, 151 Glasgow St., Guelph, Ontario, Canada. 1948
*Steffen, Earnest William, 1000 Maplewood Dr., Cedar Rapids, Iowa. 1944
Steilberg, Robert H., 555 Sunset Rd., Louisville 6, Kentucky. 1949
Stevens, Charles E[lmo] Jr., 426 2nd St., N.E., Charlottesville, Virginia. 1947
*Stevens, O. A., State College Station, Fargo, North Dakota. 1926
Stevenson, Henry M[ills], Department of Zoology, Florida State University, Tallahassee, Florida. 1943
Stevenson, James O[sborne], Fish and Wildlife Service, Washington 25, D. C. . . . 1933
Steward, Orville Milton, Long Island Agricultural and Technical Institute, Apt. 3, Farmingdale, Long Island, New York 1950
*Stewart, Dr. Charles Amery, Route 1, New Albin, Iowa. 1949
*Stewart, Miss Mildred, 2219 Devonshire Dr., Cleveland 6, Ohio. 1949
*Stewart, Paul A[lva], 8640 N. State St., Westerville, Ohio. 1925
Stewart, Robert Earl, Patuxent Research Refuge, Laurel, Maryland. 1939
*Stillwell, Jerry E., Box 5742, Dallas 2, Texas. 1935
**Stine, Miss Perna M., Route 5, Olney, Illinois. 1931
*Stitt, Merle E., 3 Keppler Court, Ann Arbor, Michigan. 1950
***Stoddard, Herbert Lee, Sherwood Plantation, Route 5, Thomasville, Georgia. 1916
Stofer, Martha Miller (Mrs. W. E.), 730 Grand Ave., Glen Ellyn, Illinois. 1948
*Stokes, Allen W., 1014 University Bay Dr., Madison 5, Wisconsin. 1950
Stoner, Emerson Austin, 149 East L. St., Box 444, Benicia, California. 1947
***Stoner, Lillian C. (Mrs. Dayton), 399 State St., Albany 6, New York. 1945
*Stophlet, John J[ermain], 2612 Maplewood Ave., Toledo 10, Ohio. 1934
*Storer, Robert Winthrop, Museum of Zoology, University of Michigan, Ann Arbor, Michigan. 1938
*Storer, Tracy I[rwin], Division of Zoology, University of California, Davis, California 1928
*Straw, Richard M[yron], 973 W. County Rd. B., St. Paul 8, Minnesota. 1947
Strecker, Robert L[ouis], Zoology Department, University of Wisconsin, Madison 6, Wisconsin 1949
*Street, Phillips B[orden], 520 Packard Bldg., Philadelphia 2, Pennsylvania. 1946
Street, Thomas M., State Department of Health, Bureau of Vector Control, 2180 Milvia St., Berkeley 4, California 1940
***Strehlow, Elmer William, 520 E. Montana St., Milwaukee 7, Wisconsin. 1941
*Stringer, Kirby [Odell], Box 772, Memphis 1, Tennessee. 1950
Stringham, Dr. Emerson, Box 986, Kerrville, Texas. 1940
****Strong, R[euben] M[yron], 5840 Stony Island Ave., Hyde Park Station, Chicago, Illinois . . . . . Founder

Struthers, Dana R., 4858 Fremont Ave., S., Minneapolis 9, Minnesota 1948
Stullken, Donald Edward, Department of Forestry and Conservation, Purdue University, West Lafayette, Indiana 1950
Stupka, Arthur, Great Smoky Mountains National Park, Gatlinburg, Tennessee .. 1935
***Sturgeon, Myron T., Department of Geography and Geology, Ohio University, Athens, Ohio 1934
*Sturm, [William] Louis, S. O. M. Center Rd., Solon, Ohio 1943
*Suthard, James G[regory], 1881 Raymond Ave., Long Beach 6, California 1936
Sutherland, Mrs. Robert L., 1513 Gaston Ave., Austin 21, Texas 1950
Suttkus, Royal Dallas, Fernow Hall, Cornell University, Ithaca, New York 1947
***Sutton, George Miksch, Museum of Zoology, University of Michigan, Ann Arbor, Michigan 1920
Swanson, Gustav [Adolph], Fernow Hall, Cornell University, Ithaca, New York .. 1927
Svärdson, Gunnar, Ödmårdsvägen 17, Traneberg, Sweden 1949
*Swedenborg, Ernie D[avid], 4905 Vincent Ave., S., Minneapolis 10, Minnesota 1929
*Sweet, William O., 175 Park St., Attleboro, Massachusetts 1949
**Taber, Wendell, 3 Mercer Circle, Cambridge, Massachusetts 1936
*Tabler, Fan Boswell (Mrs. William B.), 2923 Riedling Dr., Louisville 6, Kentucky 1947
*Tabor, Miss Ava Rogers, 305 Canal Blvd., Thibodaux, Louisiana 1940
*Taintor, Mrs. Elizabeth Taber, 11 Story St., Cambridge 38, Massachusetts 1945
Tallman, William S[weet] Jr., 4 Linden Place, Sewickley, Pennsylvania 1940
Tanghe, Leo J[oseph], 852 Stone Rd., Rochester 16, New York 1943
Tanner, James Taylor, Department of Zoology, University of Tennessee, Knoxville 16, Tennessee 1937
Tashian, Richard E[arl], 178 Canonchet Ave., Gaspee Plateau 5, Rhode Island 1949
***Taylor, Dr. Arthur Chandler, 309 N. Drew St., Appleton, Wisconsin 1929
***Taylor, Mrs. H. J., 900 Santa Barbara Rd., Berkeley, California 1916
*Taylor, H[erbert] S[tanton], 1369 Fair Ave., Columbus 5, Ohio 1948
*Taylor, Joseph William, 590 Allen's Creek Rd., Rochester 10, New York 1946
*Taylor, Dr. R[obert] L[incoln], 810 Highland Dr., Flintridge, Pasadena 2, California 1947
*Taylor, William Ralph, Museum of Zoology, University of Michigan, Ann Arbor, Michigan 1940
*Teachenor, Dix, 1020 W. 61st St., Kansas City, Missouri 1923
*Teale, Edwin Way, 93 Park Ave., Baldwin, Long Island, New York 1948
Tenney, Albert R., Route 1, Toronto, Ohio 1949
*Terrill, Lewis McIver, 216 Redfern Ave., Westmount, Montreal 6, Quebec, Canada 1948
Thacher, S. Charles, 2918 Brownsboro Rd., Louisville 6, Kentucky 1942
*Thomas, Edward S[inclair], Ohio State Museum, Columbus 10, Ohio 1921
*Thomas, Landon B[aillie], 1006 Blaine St., Edgerton, Wisconsin 1947
*Thomas, Ruth H. (Mrs. Rowland), 410 E. Green St., Morrillton, Arkansas 1937
Thompson, Daniel Q., 521 E. Mifflin St., Madison 3, Wisconsin 1945
Thompson, Donald R[uff], 2920 Shore Acres Rd., Madison 4, Wisconsin 1947
Thompson, Mrs. Helen Taylor, St. Francis Lane, Lockhaven, Norfolk 5, Virginia .. 1949
*Thorley, Robert F., 3 Midland Gardens, Bronxville 8, New York 1946
Thorne, Oakleigh II, Box 347, Islip, Long Island, New York 1947
Thornton, Wilmot A[rnold], Department of Zoology, University of Texas, Austin 12, Texas 1948

***Thorp, George B[oulton], 118 Maple Ave., Pittsburgh 18, Pennsylvania 1935
Thorson, Thomas B[ertel], Department of Zoology, University of Washington, Seattle, Washington 1949
*Throne, Alvin L., State Teachers College, Milwaukee 11, Wisconsin 1949
Thurow, Gordon [Ray], 5555 Woodlawn Ave., Chicago 37, Illinois 1948
*Tilley, Francis Thomas, 26 Mohican Ave., Buffalo 8, New York 1944
Tinbergen, Niko[laas], Department of Zoology, University Museum, Oxford, England 1947
Tipton, Samuel R[idley], 300 W. Adair Dr., Fountain City, Knoxville 18, Tennessee 1941
**Todd, Elizabeth D. (Mrs. Paul H.), 918 W. Main St., Kalamazoo 48, Michigan .. 1939
Todd, George K[endall], Laramie County Health Unit, 315 W. 20th St., Cheyenne, Wyoming 1943
*Todd, Henry O[liver] Jr., Woodbury Rd., Murfreesboro, Tennessee 1938
Todd, Mabel Sellers (Mrs. A. P.), 1622 Cherryhurst Ave., Houston 6, Texas 1940
*Todd, W[alter] E[dmond] Clyde, Carnegie Museum, Pittsburgh 13, Pennsylvania .. 1911
*Tomich, P[rosper] Quentin, Hastings Reservation, Jamesburg Route, Robles del Rio, California 1948
*Tomkins, Ivan Rexford, 1231 E. 50th St., Savannah, Georgia 1931
Tordoff, Harrison B[ruce], Natural History Museum, Kansas University, Lawrence, Kansas 1947
**Tout, Wilson, Box 678, North Platte, Nebraska 1946
**Townsend, Miss Elsie White, Department of Biology, Wayne University, Detroit, Michigan 1938
***Trautman, Milton B[ernhard], Stone Laboratory, Put-in-Bay, Ohio 1932
*Traylor, Melvin Alvah Jr., 759 Burr Ave., Winnetka, Illinois 1947
Trimm, H. Wayne, 165 Strong Ave., Syracuse 10, New York 1943
Trowern, Robert Wilson, Box 400, New Liskeard, Ontario, Canada 1948
*Truesdell, Mrs. Alice Riner, 641 S. Roosevelt Ave., Wichita 17, Kansas 1950
*Trussell, Miss Malvina, 2011 Lee Ave., Tallahassee, Florida 1946
*Tryon, C[larence] A[rcher] Jr., Department of Biological Sciences, University of Pittsburgh, Pittsburgh 13, Pennsylvania 1942
***Tucker, Mrs. Carll, Penwood, Mount Kisco, New York 1928
*Tucker, Robert Edward, 245 N. Auburndale, Memphis, Tennessee 1942
*Tucker, Walter A[ndrew], 728 S. Remington Rd., Columbus 9, Ohio 1948
Tuttrup, Miss Jane, Bowie Mill Rd., Route 1, Derwood, Maryland 1949
Tvedt, Harold B[loom], Box 506, McNary, Arizona 1941
**Twomey, Arthur C[ornelius], Carnegie Museum, Pittsburgh 13, Pennsylvania 1936
*Tyler, Dr. Winsor M[arrett], 1482 Commonwealth Ave., Brighton 35, Massachusetts 1914
*Uhler, Francis Morey, Patuxent Research Refuge, Laurel, Maryland 1931
**Uhrig, Corinne (Mrs. Alex B.), Box 28, Oconomowoc, Wisconsin 1926
Umbach, Miss Margaret, 2526 East Dr., Fort Wayne 3, Indiana 1941
*Undershill, Slayton, Wilmington, Essex County, New York 1950
Ussher, Richard Davy, Nancy Lake Farm, King, Ontario, Canada 1947
*Vaiden, M[eredith] G[ordon], Rosedale, Mississippi 1937
Van Arsdall, C[harles] A[lexander], 1024 Beaumont Ave., Harrodsburg, Kentucky .. 1946
Van Coevering, Jack, 6170 Commerce Rd., Route 5, Pontiac, Michigan 1939
*Vandergrift, Miss Elizabeth R[uth], 183 McLaughlin Ave., Muskegon, Michigan .. 1949
Van Dyke, Henry, 915 Oakland Ave., Ann Arbor, Michigan 1948

Van Dyke, Henry I., 242 Greenwood Ave., Battle Creek, Michigan. 1950
Vane, Robert F[rank], 600 Dows Bldg., Cedar Rapids, Iowa. 1946
***Van Tyne, Josselyn, Museum of Zoology, University of Michigan, Ann Arbor, Michigan 1922
***Vaughan, William C[oleman], 115 Fairbanks Ave., Kenmore 17, New York. 1938
Vaurie, Charles, % American Museum of Natural History, 79th St. and Central Park W., New York 24, New York. 1946
*Vincent, Bro. Ignatius F.S.C., Christian Brothers College, East Parkway at Central, Memphis 4, Tennessee 1949
*Vollmar, Rhea Lewis (Mrs. Joseph E.), 6138 Simpson Ave., St. Louis 10, Missouri. . 1941
*von der Heydt, James A[rnold], 710 North Lake Shore Dr., Chicago 11, Illinois. . 1947
*Vore, Marvin E[lmer], 1128 N. 8th Ave., West Bend, Wisconsin. 1947
Wade, Douglas E., Dartmouth College, Hanover, New Hampshire. 1950
*Wade, Katherine White (Mrs. Sydney J.), Route 1, Box 229 A., Jefferson City, Missouri 1940
*Wagner, Miss Esther E., 13 Locust Ave., Danbury, Connecticut. 1937
*Wagner, Nancy Elizabeth (Mrs. C. R.), South Lane Farm, Utica, Ohio. 1947
Wagner, Helmuth O., Apartado 7901, Sucursal 3, Mexico, D. F. 1945
*Walker, Charles F[rederic], Museum of Zoology, University of Michigan, Ann Arbor, Michigan 1939
*Walker, Jason A[lison], 89 Church St., Box 295, Waterloo, New York. 1949
Walker, M[yrl] V[incent], Zion National Park, Springdale, Utah. 1943
***Walkinshaw, Lawrence Harvey, 1703 Central National Tower, Battle Creek, Michigan 1928
*Wallace, Miss Edith Adell, 421 W. 8th Ave., Gary, Indiana. 1945
*Wallace, George J[ohn], Department of Zoology, Michigan State College, East Lansing, Michigan 1937
Wallner, Dr. Alfred, 5929 Wardlow Road, Long Beach 8, California. 1941
Walsh, Robert W., 1364 Hartford Ave., St. Paul, Minnesota. 1949
Walters, Miss Kathleen, 312 Crane, Royal Oak, Michigan. 1944
*Wampole, John H[enry], Box 447, Grant, Nebraska. 1944
*Wandell, Willet N[orbert], Natural History Survey, Urbana, Illinois. 1944
Wangnild, Miss Lillian M[arie], 2818 Gaylord St., Denver 5, Colorado. 1943
Wanless, Harold R[ollin], 704 S. McCullough St., Urbana, Illinois. 1940
Warner, Dwain Willard, Museum of Natural History, University of Minnesota, Minneapolis 14, Minnesota 1946
Warters, Miss Mary Ellen, 5115 Woodland Ave., Des Moines 12, Iowa. 1950
*Waterman, Ralph T[en Eyck], 13 Meadow Rd., Poughkeepsie, New York. 1947
Watkins, Mrs. Ray T., 620 Pickwick Lane, Chevy Chase, Maryland. 1950
*Watson, Frank Graham, Shell Chemical Corporation, Box 2633, Houston 1, Texas 1937
Watson, Harold John, 246 Fishkill Ave., Beacon, New York. 1949
Watson, James Dewey Jr., 7922 Luella Ave., Chicago 17, Illinois. 1945
*Watson, Robert J[ames], Box 75, Blacksburg, Virginia. 1943
Weaver, Mrs. Alice Helen Brown, 1434 Crain St., Evanston, Illinois. 1948
Weber, Louis M[arkus], House Springs, Missouri. 1941
*Webster, Clark G[ibbons], Patuxent Research Refuge, Laurel, Maryland. 1948
*Webster, J[ackson] Dan, Hanover College, Hanover, Indiana. 1939
*Weise, Charles M[artin], 654 Orchard Ave., Bridgeville, Pennsylvania. 1949
*Weiser, Virgil Leonard, 507 2nd Ave., E., Dickinson, North Dakota. 1946

*Weller, Milton Webster, Route 1, Columbia, Missouri 1950
Welles, Mary Pyke (Mrs. George M.), Route 1, Elmira, New York 1938
Welsh, John R. Jr., % The American Radio Relay League, Incorporated, Kingston, Illinois 1950
*Welty, Carl, Route 1, Beloit, Wisconsin 1948
**Wernicke, Maleta Moore (Mrs. Julius F.), Gull Point, Escambia County, Florida .. 1944
*West, Adele H. (Mrs. E. M.), Route 1, Box 169, Piney Flats, Tennessee 1950
Weston, Henry G[riggs] Jr., Department of Biology, Grinnell College, Grinnell, Iowa 1947
**Weston, Robert, Old Ferry Rd., North Castine, Maine 1944
Wetherbee, David K[enneth], Museum of Natural History, 12 State St., Worcester 8, Massachusetts 1947
*Wetmore, Alexander, United States National Museum, Washington 25, D. C. 1903
*Weydemeyer, Winton, Fortine, Montana 1930
Weyer, Albert E., Department of Zoology, North Dakota Agricultural College, Fargo, North Dakota 1949
*Weyl, Edward Stern, 6909 Henley St., Philadelphia 19, Pennsylvania 1927
Wheatland, Miss Sarah B[igelow], 85 Sachem St., New Haven, Connecticut 1942
Whitaker, Lovie M. (Mrs. John R.), School of Journalism, University of Oklahoma, Norman, Oklahoma 1947
Whitcomb, Pemberton, 130 Cedar St., New York 6, New York 1949
*Whitehead, Miss Edith May, % Health Department, Monett, Missouri 1947
*Whiting, Robert A[rchie], 1228 Chittock Ave., Jackson, Michigan 1947
*Whitney, Dr. Nathaniel R[uggles] Jr., Salt Lake County General Hospital, Salt Lake City, Utah 1942
Widmann, Berthold, 4621 Wesley Ave., Los Angeles 37, California 1936
*Wiggin, Henry T[aylor], 151 Tappan St., Brookline, Massachusetts 1941
*Wilcox, Harry Hammond Jr., Department of Anatomy, Medical School, University of Pennsylvania, Philadelphia 4, Pennsylvania 1938
Wilcox, LeRoy, Speonk, Long Island, New York 1944
*Wilder, Theodore G[arfield], 125 Oxford Rd., Waukesha, Wisconsin 1948
Wiles, Harold O[liver], 623 Campbell Ave., Kalamazoo 51, Michigan 1936
Wilkowski, William [Walter], 119 Bronson Ct., Kalamazoo 12, Michigan 1943
*Williams, George G., The Rice Institute, Houston, Texas 1945
*Williams, Laidlaw O[nderdonk], Route 1, Box 138, Carmel, California 1930
Williams, Raymond E., 330 Burlwood Ave., Oakland 3, California 1950
*Willis, Cornelius G[rinnell], 750 Subway Terminal Bldg., Los Angeles 13, California 1948
Willis, Franklin E[lling], Stewartville, Minnesota 1946
Willis, Miss Myra G., 1726 4th Ave., S. E., Apt. C., Cedar Rapids, Iowa 1944
Willms, A. George, Route 2, Urbana, Illinois 1950
**Wilson, Archie F[rancis], 1322 Braeburn Rd., Flossmoor, Illinois 1937
*Wilson, Bruce Vernon, 815 N. Chipman St., Owosso, Michigan 1943
*Wilson, Ruth (Mrs. Carl), 11285 Lakepointe, Detroit 24, Michigan 1941
*Wilson, Gordon, 1434 Chestnut St., Bowling Green, Kentucky 1920
*Wilson, Harold Charles, Ephraim, Wisconsin 1938
Wilson, John Elder, 332 Magnolia St., Rochester 11, New York 1948
*Wilson, Rowland S[teele], 2130 E. Broad St., Columbus 9, Ohio 1941
Wilson, Wynn Avis, 817 Greer St., Fort Worth, Texas 1950
***Wineman, Andrew, 150 Michigan Ave., Detroit, Michigan 1934

***Wing, Harold F[rancis], Route 3, Jackson, Michigan 1941
*Wing, Leonard [William], Department of Wildlife Management, Texas A. & M. College, College Station, Texas 1924
Winn, Howard Elliott, 398 N. Elm St., West Bridgewater, Massachusetts 1947
Wistey, [Edna] Lorene S. (Mrs. A. L.), South English, Iowa 1944
Witmer, S[amuel] W[enger], 1608 S. 8th St., Goshen, Indiana 1948
*Witte, Miss Agatha Wilhelmina, East Churchill St., Mt. Savage, Maryland 1949
Wolfarth, Floyd Parker, 133 High Street, Nutley, New Jersey 1950
Wolfe, Harold R[eclus], Biology Bldg., University of Wisconsin, Madison 6, Wisconsin 1947
Wolff, John L[udwig], 38 Crane Rd., Scarsdale, New York 1948
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BY W. RUSSELL DEGARMO AND GEORGE H. BREIDING

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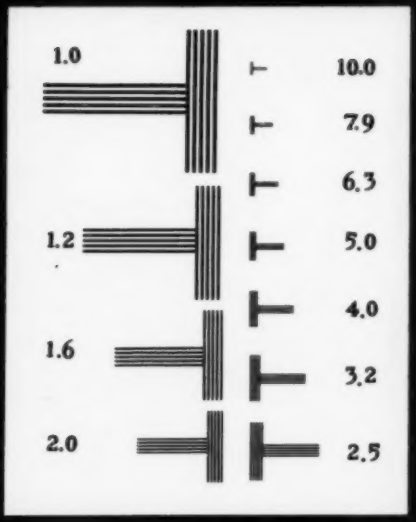

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In microfilming, it is necessary to determine the reduction ratio and multiply the number of lines in the chart by this value to find the number of lines recorded by the film. As an aid in determining the reduction ratio, the line above is 100 millimeters in length. Measuring this line in the film image and dividing the length into 100 gives the reduction ratio. Example: the line is 20 mm. long in the film image, and $100/20 = 5$.

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